An Effective Knowledge Transfer Method

A theory of dyadic knowledge transfers in IT sourcing contexts

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Abstract

IT sourcing importance has steadily increased during the past ten years, both as a research field and as a management practice. Existing research has addressed many contractual aspects of IT sourcing. The presented research focuses on an increasingly important area within the IT sourcing field that has received little attention so far. This thesis studies the knowledge transfer between sourcing client and sourcing vendor. The subject of interest is particularly the knowledge transfer taking place in the transition of services from and to a vendor. Results of this study are summarized in a theoretic model described as a method. The research entails two research streams. During the case study research 13 IT sourcing cases are analyzed from a vendor and a client perspective. The analysis includes executive, management and employee interviews. During a piloting study several approaches to knowledge transfer in IT sourcing relationships were tested. The piloting study presents a total of six knowledge transfers. At the conclusion of the piloting study findings from the case study and the piloting study are combined with relevant literature sources to formulate a set of assumptions and constraints. These assumptions and constraints are later implemented in an exemplary knowledge transfer method suitable for use in IT sourcing projects, particularly as part of the IT sourcing transition phase. Such a method has shown to be effective and in some cases efficient to transfer knowledge in actual IT sourcing initiatives. Therefore this thesis presents not only a conclusive account of knowledge transfer in IT sourcing initiatives but also provides a new practical theory of how such knowledge transfers can be managed in general.

Zusammenfassung

In den vergangenen zehn Jahren ist IT Sourcing sowohl als Forschungsgebiet als auch als Geschäftsfunktion immer wichtiger geworden. Bisherige Forschung hat sich im Wesentlich auf vertragsrelevante Themen konzentriert. Die vorliegende Arbeit befasst sich mit einem immer wichtiger werdenden Thema innerhalb des IT Sourcing Feldes, welches jedoch bisher wesentlich weniger Aufmerksamkeit erlangt hat. Diese Arbeit untersucht den Wissenstransfer zwischen Sourcing-Kunde und Sourcing-Anbieter. Die Ergebnisse dieser Untersuchung sind in einem theoretischen Model in Form einer Methode zusammengefasst. Es werden zwei Forschungsvorhaben präsentiert. Während eines Fallstudienforschungsvorhabens werden 13 IT Sourcing Fälle analysiert. Es werden jeweils die Standpunkte von Direktoren, Managern und Mitarbeitern der Anbieter und Kunden berücksichtigt. In einem Pilotforschungsvorhaben werden unterschiedliche Verfahren des Wissenstransfers in insgesamt sechs Fällen untersucht. Schliesslich werden die Beobachtungen der Fallstudien und der Pilotierung mit bestehender Literatur verknüpft und eine Sammlung von Annahmen und Einschränkungen wird erstellt. Diese Annahmen und Einschränkungen bilden die Basis für eine im IT Sourcing einsetzbare exemplarische Wissenstransfermethode. Die Methode ist insbesondere für die Transitionsphase eines IT Sourcing Vorhabens entwickelt worden. Die präsentierte Methode hat sich als effektiv und in einzelnen Fällen als effizientes Verfahren zum Wissenstransfer im industriellen Einsatz herausgestellt. Somit präsentiert diese Arbeit nicht nur eine schlüssige Wissenstransfermethode für IT Sourcing Vorhaben, sondern beschreibt auch eine neue praxistaugliche Theorie um Wissenstransfer im Allgemeinen zu strukturieren, organisieren und durchzuführen.

Preface

A thesis should not have a preface. Unfortunately I did not measure up to this claim. After spending many nights and days, mostly nights, on my thesis project I only realize at the end how much stress I must have put on my social environment. I offer my apologies to anyone who feels I have been grumpy, un-social and generally unavailable for the past two years. I am sorry and this will improve, just allow me some more time to get used to normal social interactions again.

I would also like to extend my gratitude to the many managers and firms that supported this research by spending so much time and resources answering so many questions, entrusting us with critical information and piloting our ideas. Furthermore, the support I received from my colleagues and especially from my advisor, Prof. Gerhard Schwabe has been invaluable. Despite the occasional depressing moment, this has been an exciting and entertaining project. I would also like to thank my employer for allowing me to spend the necessary time refining this thesis as needed.

Finally, my statistically… most significant person in life merits a promise for tolerating so much erratic behavior while I went through all the phases of academic formation. I am certain, this has not been easy.

Therefore, Karin, I promise: Never again!

Zürich, 8.2.2009

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1 Introduction

Growth in the information technology services industry is slowing. The compounded annual growth rate of 6.37% in the period from 2000 to 2005 (OECD 2006) is down from 10% in the early 1990s. However, the industry remains a large market. In 2005, the IT services sector had a worldwide market volume of 166 billion US dollars. A large share of this growth was due to client firms handing over IT service operations and responsibilities to external vendors (IT outsourcing). However, the recent re-negotiations of large contracts (Mathew et al. 2007), as well as massive lay-offs (REUTERS 2007) are clear signs of increasing cost pressure and are early indicators of a maturing IT sourcing[1] market. Our own research with Swiss banks has also found that some clients are taking back selected outsourced services; this is referred to as "backsourcing", which is the reverse of outsourcing. Companies like UBS have even taken back large, externally held operations of outsourced services. Since the market is reaching a more mature stage, more re-negotiations will result in more transitions of service from one vendor to another, with transitions back to a client likely to remain the exception. Researchers (Power et al. 2004) and practitioners (Mathew et al. 2007) agree that the most critical aspect of a sourcing initiative is the transition from one service operator to another. One particular aspect of the transition is the transfer of knowledge. Knowledge transfers are expected to become much more frequent as clients begin to switch vendors more often as a result of the IT sourcing market becoming more mature.

Knowledge transfers today are, to a large extent, unstructured ad-hoc processes designed specifically for a single IT sourcing case, occurring because of the absence of a published knowledge transfer method that could be adapted. Such customized processes require IT sourcing practitioners to spend enormous resources in designing them without any points of reference. Moreover, neither the existing body of research on IT sourcing, nor the field of knowledge management or knowledge transfer in particular, has provided practitioners with a method to manage this aspect of IT sourcing. The problem of defining a knowledge transfer method has prompted a Swiss financial services company to partner with the University of Zurich on a research project to develop such a method.

The result of this research project is this thesis and presents a method to systematically support knowledge transfer in IT sourcing initiatives. The method is composed of seven method element (Braun et al. 2005): a procedure model, roles, activities, results, tools, and an

[1] We will use "IT sourcing" to refer generally to outsourcing, backsourcing, re-sourcing, or insourcing. If we are referring to any specific outsourcing type, we will use the corresponding wording.

information model - in addition to the corresponding design principles. We outline the method design process and our deployment in a real world backsourcing scenario involving two software development teams. Furthermore, after describing our research project, we examine how our approach has been deployed by the piloting organization and has even been evaluated for intra-firm knowledge transfer. The firm has created a position to maintain and teach the method to project managers as well as to enhance it with respect to applicability and practical relevance. Additional plans are under development, at the time of this writing, to adapt the method for intra-firm knowledge transfer. Our project sponsor plans to adapt our method to manage employee fluctuation, specifically by employing some of the method's activities during employee debriefings to increase the amount of critical knowledge that will remain in the company.

In the following sections we will first provide our research motivation, research question, and our conceptual model before outlining the structure of this thesis.

1.1 Motivation

IT sourcing received more prominent attention starting in 1989, with the outsourcing of Kodak's information technology to Digital Equipment Corporation (Applegate 1994) and the agreement between Xerox and EDS (Applegate 2002) in 1994. The increasing importance of service in the IT industry also became apparent in the relatively high compounded annual growth rate (CAGR) of 10% in the 1990s. This growth was fuelled partly by the burgeoning outsourcing business (OECD 1997).

Outsourcing, or contracting out certain processes, has been carried over from the manufacturing industry to the IT industry. Managers became aware that concepts such as transaction costs (Williamson 1979) work well to determine firm's boundaries not only regarding their production operations, but also their back-office operations, notably, information technology. This trend increased further when Quinn and Hillmer (Quinn and Hillmer 1994) highlighted the opportunity to focus more on core competences through outsourcing. Subsequently, the IT service market grew from 161 billion USD in 1995 to 308 billion USD in just three years. This was considerable growth, even with the backdrop of the "dot com" industry. IBM Global Services, a division of IBM Corporation and manager of IBM's IT sourcing business, reported earnings of 22 billion USD in 1998, making IBM by far the largest IT sourcing vendor in the market, followed by EDS with reported revenue of 17 billion USD. However, since 2000 the total revenue grew at a slower rate (Figure 1-1). While the reported CAGR in the early 1990s was at 10%, it fell to 7.7% in the late 1990s and was only about 6% in the period between 2000 and 2005.

Million USD	Revenue 1998	Revenue 2000	Revenue 2002	Revenue 2003	Revenue 2005
IBM	28'916	33'152	36'360	42'635	47'357
EDS	17'243	18'856	21'502	21'731	20'377
Tech Data	7'056	16'992	17'198	15'739	19'790
Accenture	8'307	11'331	13'105	13'397	17'094
CSC	8'111	9'345	11'379	11'347	14'059
First Data+	5'431	5'922	7'636	8'129	10'460
ADP	4'926	6'168	7'004	7'147	8'499
Capgemini	4'397	6'359	6'648	6'632	8'328
IAC/Interactive*	2'719	2'965	3'166	3'380	3'609
SAIC+	3'668	4'000	5'771	5'903	7'187
Unisys	7'244	6'885	5'607	5'709	5'772
Total	98'018	121'975	135'376	141'749	162'532

+ Revenue of 1998 estimated based on a 10y CAGR of 7.7% for the period.
* Except for 2000, revenues are estimated based on a 5y CAGR of 7.7% prior to 2000 and of 6.3% after 2000.

Figure 1-1: Revenue of the top 11 IT service firms for 1998 – 2005 (OECD 1997; OECD 2000; OECD 2002; OECD 2004; OECD 2006; IBM 2007).

While these numbers indicate that the market is still growing, the period of biggest growth has passed and the IT sourcing market is likely to become more mature over the years. Whereas IBM comfortably holds its position as market leader, EDS is challenged by TechData and Accenture. Both challengers showed higher growth than EDS and lost fewer contracts to competitors. Consolidation in the low-end of the market seems rather likely, since many clients still prefer a single IT provider over multi-sourcing contracts. Providing a broad range of services to clients and benefiting from economies of scale is difficult and may drive smaller vendors to either merge or submit joint bids, as Capgemini and Fujitsu or EDS and Accenture have done in the past. Another indicator that the market is maturing is the fact that clients are starting to re-contract business, not to incumbents but to competition. The UK tax authority, HM Revenue and Customs, which is responsible for collecting most taxes in the United Kingdom, recently switched IT operations worth a total contract value of 6-8 billion USD from EDS and Accenture to Capgemini and Fujitsu, with Accenture being a subcontractor (Mathew et al. 2007). Similarly, UBS, a large Swiss investment and private bank, recently brought back in-house business worth about 50 million USD per year. The decision required transferring several hundred employees, partially from remote locations, to its headquarters in Zurich (Finextra 2004). While these large vendor switches are likely to be the exception, as the market matures, clients may become more price-sensitive and strategic priorities may shift. Clients will re-assess their existing IT sourcing contracts and they may find that they would either like to switch vendors or take back selected business functions formerly provided by an external party. Therefore, it is likely that we will see more re-competition in the future.

As services are more frequently transferred between different firms, the efficacy and efficiency of an IT sourcing life cycle gains more importance. In particular, the transition process, as part of the IT sourcing life cycle, becomes a central element of an IT sourcing initiative. The transition process has been reported to be almost twice as cost-intensive (1.2% of the total contract value) as the whole architecture phase including contracting and vendor selection (0.7% of the total contract value) (Mathew et al. 2007). Current research has focused primarily on many of the earlier IT sourcing phases, especially vendor selection and contract aspects (Lacity and Willcocks 1998). Criteria for selecting vendors have been proposed by Feeny et al. (Feeny et al. 2006) and strategic decision-making instruments have been discussed (Quinn and Hillmer 1994; Venkatesan 1992). To facilitate operations, which are the most expensive part of IT sourcing at an average cost of 4.2% of the total contract value (Lacity and Willcocks 1998), research in IT sourcing contracts recommends that a series of IT sourcing specific client and vendor obligations be fulfilled (Koh et al. 2004). Researchers have also suggested a relationship-based set of capabilities that clients and vendors should be developing before and during the construction of an IT sourcing deal (Cullen et al. 2006). A practitioner-focused sourcing capability model has been proposed by researchers at Carnegie Mellon University (Hyder et al. 2004a, b; William E. Hefley and Loesche 2006) to track most aspects during outsourcing and backsourcing operations.

So far, the IT sourcing transition has received very little attention from researchers or practitioners. Despite the fact that, assuming the continuation of current market trends, the transition process will occur far more often and it will therefore become more important to reduce its considerable costs (Power et al. 2004), concrete management advice is lacking. One of the most critical steps during the transition is the transfer of knowledge from the source organization to the receiver organization (Willcocks et al. 2007). The importance of retaining relevant knowledge even when a business function is found not to be a core competence, thereby rendering it appropriate for outsourcing, has been suggested as early as the early 1990s (Quinn and Hillmer 1994; Venkatesan 1992). Power et al. (Power et al. 2004) single out knowledge transfer as a critical outsourcing trap, and Koh et al. (Koh et al. 2004) mention knowledge management as prominently as several others (Hyder et al. 2004a, b; William E. Hefley and Loesche 2006). The recent filing of a patent application for an IT tool to facilitate knowledge transfer in IT sourcing initiatives is further evidence of the economic importance of the subject (Swaminathan and Nebolsky 2005). Nevertheless, despite wide regard for this subject, no research has been conducted to investigate concrete activities to solve the problem of knowledge transfer in IT sourcing initiatives (Willcocks et al. 2007).

Given the complexity of transition planning outlined above, IT sourcing contracts, the primary instrument controlling complexity, usually include exit clauses to specify cost-ceilings and to assure the availability of key personnel (Callow et al. 2006; Mathew et al. 2007; Sparrow 2003). However, without an understanding of the specific activities regarding knowledge transfer in the transition process, much of the contract termination planning may prove to be inadequate. As a result, either outsourcing partner may be held responsible for fulfilling certain obligations under the contract, even though neither may have the necessary resources. Even worse, fulfilling these obligations may disrupt business operations considerably, even to the point of financial consequences. To mitigate these risks, clients and providers need to understand the required knowledge transfer activities in advance to ensure that the necessary resources are available at the point of contract termination.

Our research question arises out of this gap in IT sourcing literature regarding a solution to the knowledge transfer problem and the increasing demand for an effective and efficient IT sourcing transition. The following section describes our specific research interest and examines the prior research.

1.2 Research questions and conceptual model

In order to address the problem of knowledge transfer in IT sourcing settings, we focus on a methodological solution. We are developing concrete guidelines and activities that managers and practitioners can either easily adapt to their own environment, or use directly without modification to plan and execute knowledge transfer as part of IT sourcing vendor transitions. To contextualize our research the following paragraphs place our research in the context of the available literature on knowledge management and IT sourcing.

Knowledge transfer is part of the wider field of knowledge management. In the model of knowledge management process proposed by Probst et al. (Probst et al. 1999), knowledge transfer is related to knowledge acquisition and knowledge distribution (Figure 1-2).

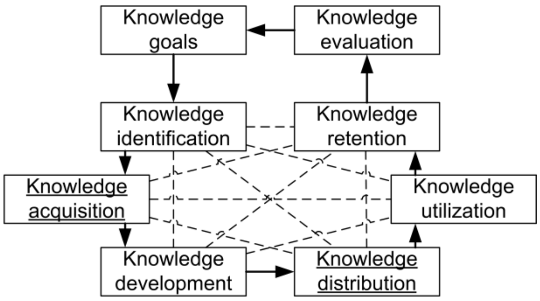

Figure 1-2: Model of the knowledge management process according to Probst et al. (Probst et al. 1999)

According to this model, the knowledge source engages in knowledge distribution, and the knowledge receiver starts knowledge acquisition. A similar process model has been proposed by Alavi and Leidner (Alavi and Leidner 2001), who describe a knowledge transfer process. However, in contrast to Probst et al. (Probst et al. 1999), these authors do not mention other elements critical to knowledge management, or the important antecedents of knowledge transfer, notably knowledge identification and knowledge goals.

The knowledge transfer process has been particularly well described by Szulanski (Szulanski 1999). Szulanski describes four phases of knowledge transfer initiation, implementation, ramp-up, and integration. He describes the antecedent of knowledge transfer in the initiation phase as the time when knowledge is selected, needs are established, and knowledge transfer is planned. The implementation phase covers mainly the communication procedures between knowledge receiver and knowledge source. In the ramp-up phase, the knowledge receiver applies the newly acquired knowledge and may adapt the knowledge to suit the new environment better. These adaptations, if they prove successful, are then distributed throughout the organization in the integration phase. In contrast to our own work, which studies knowledge transfer between different firms, Szulanski's research (Szulanski 1999) provides insights into possible knowledge transfer processes within firms.

Similarly to Szulanski (Szulanski 1999), van Krogh and Marija (van Krogh and Marija 1998) suggest another process for intra-firm knowledge transfers. However, their work simplifies the process into three steps. The authors omit the critical phases when individuals work together and communicate and later apply the knowledge. Their proposal recommends measuring knowledge transfer success based on a shared understanding of individuals, which is more difficult to validate than the proposed work performance measure of Szulanski (Szulanski 1999). Within the context of this rich literature on knowledge management, our own work focuses on knowledge transfer between firms. We look specifically at directed knowledge transfers measured by work performance.

In particular we are interested in knowledge transfer between sourcing partners. IT sourcing is characterized by either contracting with external partners to handle certain business functions usually no longer considered as core competences, or moving a contracted-out business function to a different contract party (Quinn and Hillmer 1994). If the new contract party is again an external one, we refer to it as re-sourcing, whereas it is backsourcing if the business function is brought back to the originating firm. Our particular business function of interest is information technology. To position knowledge transfer within the IT sourcing field, we refer to the IT sourcing process model originally described as the outsourcing life cycle (Cullen et al. 2006). These authors base their structure on several hundred cases studies in the US and UK, and the framework has proven practical in explaining IT sourcing processes to practitioners.

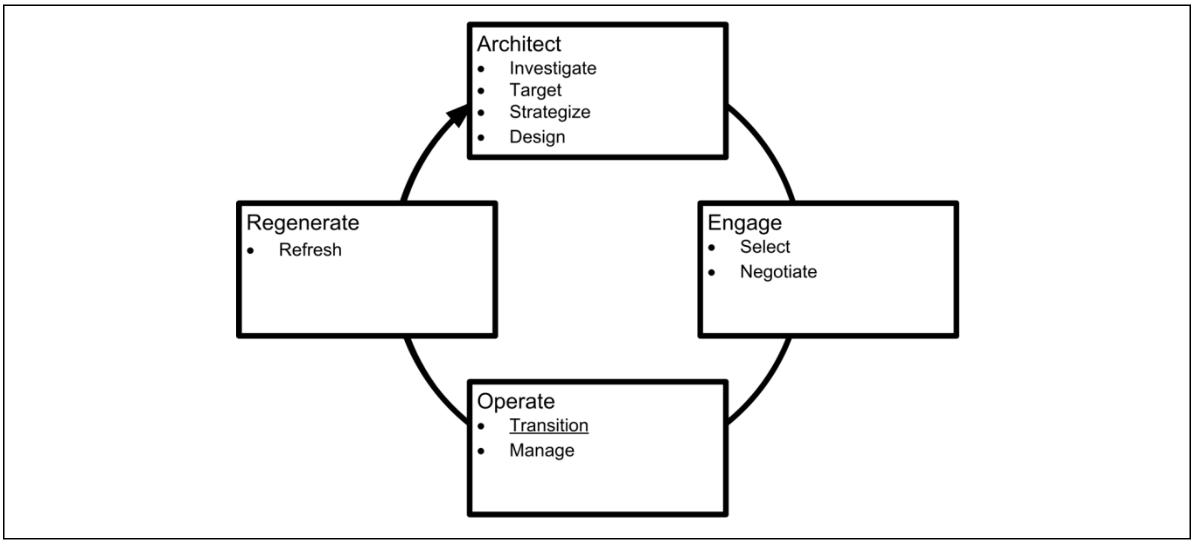

Figure 1-3: The IT sourcing process life cycle based on Cullen et al. (Cullen et al. 2006)

The four phases illustrated in Figure 1-3 include phases called architect, engage, operate and regenerate. Knowledge transfer is practiced mainly in the operate phase as part of the transition process (Cullen et al. 2006). The transition, in contrast to the manage process, happens only once for each outsourcing, backsourcing, or re-sourcing initiative. Other authors also suggest that knowledge transfers and knowledge management occur during the manage process (Hyder et al. 2004a; Koh et al. 2004; Lee 2001; William E. Hefley and Loesche 2006). However, in this study, we consider only one-time knowledge transfer. An extension of our knowledge transfer method to the more general, repeated knowledge transfer during the manage process may be considered in future research or may best be designed by the practitioners themselves using our knowledge transfer method as a reference. In the terms of the IT sourcing process life cycle, our research focuses on one-time knowledge transfer in the IT sourcing operate phase, specifically the transition process. To design a practical knowledge transfer method, we limit the scope of the method to include only directly manageable aspects. Our work is not intended to become a general purpose management method, but rather a specific tool to manage a specific problem. Therefore, some of the factors shown by earlier research to influence knowledge transfer are not considered in this study.

Therefore, our general research interest is: *What is a manageable one-time knowledge transfer method for an IT sourcing initiative?*

In order to study this question in more detail, we employ the framework of constituent elements of a method, described by Braun et al. (Braun et al. 2005). These researchers (Braun et al. 2005) list the elements found to be necessary parts of a method in general, and therefore should be implemented by a knowledge transfer method as well. All the authors surveyed by Braun et al. propose to develop a procedure model and corresponding activities, and most authors also recommend the design of roles, techniques, and an information meta-model, in addition to clear and detailed documentation. A few authors suggest providing optional IT tools to support certain techniques. Additionally, since methods should be goal-oriented, every activity should require specific results. Furthermore, the design and construction of the method should be governed by design principles[2]. Figure 1-4 illustrates the method elements that will be discussed in the following paragraphs.

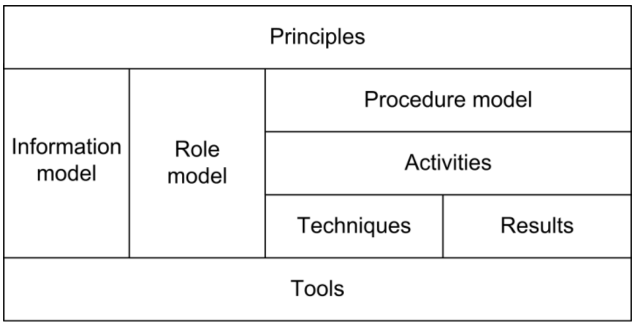

Figure 1-4: Constituent elements of a method based on Braun et al. (Braun et al. 2005)

Before we present our detailed research questions with regard to knowledge transfer in IT sourcing initiatives we present each method element. A method consists of:

[2] We use the terms „method design principles", "method principles", "design principles" and "principles" interchangeably to improve readability of the text.

- the governing method principles that are used to guide the method designer in developing the method elements. These principles are reflected in each design decision, and the activities in particular clearly identify how the method principles are being implemented.
- the procedure model which links activities, role model and information model conforming documents into a consistent framework. The procedure model contains rules on how the roles should perform each activity with what kind of information model document and when. These procedure rules define the process by which the method is performed.
- activities that correspond to defined sets of various techniques. They are performed by roles and they lead to the production of specific documents required by the information model at the end of each activity. These documents represent the results required at each milestone, which marks when an activity should be concluded.
- techniques that represent detailed instructions on how certain results are to be achieved. Techniques are usually individual steps within activities and they define a logical flow through each individual activity.
- the results of each activity result in a specific document. Each document adheres to the specification defined in the information model.
- roles that execute the activities prescribed by the procedure model. Roles are taken up by stakeholders including individuals, organizational units, or firms. Roles are typically specified by a set of requirements defining which actor may be suitable to carry it out.
- the information model that provides all result documents with a consistent set of attributes. It ensures that documents are collecting relevant data at the appropriate time, and that these documents do not collect unnecessary data.
- tools that correspond to IT software that helps to improve a method's efficiency by automating certain processes and facilitating the implementation of techniques.

Some of these method elements have been researched more than others. IT tool support, in particular, has received much attention from the computer-supported cooperative work community. Ackerman et al. (Ackerman et al. 2002) describe many of the more successful IT tools, and Schwabe (Schwabe 2001) discusses conceptual considerations. Furthermore, IT tools like the Rapid Transition Suite (Swaminathan and Nebolsky 2005) have already demonstrated the technical possibilities of IT tool support for knowledge transfer. Tools are, therefore, not a primary focus of our research. A large body of knowledge transfer techniques has already been summarized elsewhere (Bontis et al. 1999; Bugajska 2007). While we select and adapt some techniques in our research, we do not generally focus on the techniques themselves, but on how to properly design them according to the principles of our method.

These principles can be derived from the large body of research in knowledge management, particularly in knowledge transfer (Argote and Ingram 2000; Burgess 2005; Cummings and Teng 2003; Darr and Kurtzberg 2000; Goh 2002; Griffith et al. 2007; Inkpen and Dinur 1998; Ko et al. 2005; Levin and Cross 2004; Mowery et al. 1996; Osterloh and Frey 2000; Sarker 2002; Simonin 1999; Szulanski 1996, 1999; Tsai 2001). While some of these authors do consider inter-firm knowledge transfers, none has investigated knowledge transfer in IT sourcing initiatives.

In order to derive a valid set of method design principles we focus our first research question on the principles of the method: *Which factors influence knowledge transfer activities in IT sourcing initiatives?*

As described above, the body of research on knowledge transfer techniques is rather large, but few authors have collected techniques or built a defined set of activities. Several authors have made an effort to specify a process of knowledge transfer and therefore have been among the first to provide concrete activities useful for performing knowledge transfer (Inkpen and Dinur 1998; Szulanski 1999). To some extent, Argote and Ingram (Argote and Ingram 2000) also provided concrete activities that managers could apply to knowledge transfers. Finally, van Krogh and Marija (van Krogh and Marija 1998) proposed an alternative knowledge transfer process and suggested some useful techniques. However, these results - except for some of the findings of Argote and Ingram (Argote and Ingram 2000) - cover only intra-firm knowledge transfers, and are of limited use for the inter-firm knowledge transfer context of IT sourcing projects.

Our second research question therefore focuses on the activities of a knowledge transfer method in IT sourcing initiatives: *What are the relevant knowledge transfer activities and how do they interact with the IT sourcing process?*

As part of this second research question, we investigate additional method elements such as roles, results, and the information model. The procedure model is established once the activities have been identified and a way has been found to synchronize them with the IT sourcing process. Techniques and tools are applied to activities as we come to understand the function of each activity in the knowledge transfer process of IT sourcing initiatives.

Thus, our third research question addresses the procedure model of the knowledge transfer method: *How are activities, roles and results incorporated into a knowledge transfer method for IT sourcing initiatives?*

These three research questions will guide our work. The research question will be transformed into detailed assumptions in section 3.4.

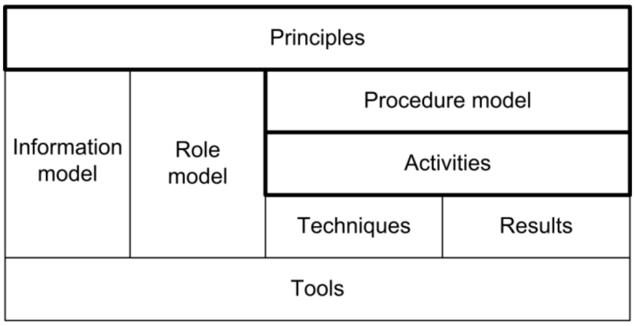

Figure 1-5: Core method elements targeted by research questions in the schema based on (Braun et al. 2005)

Figure 1-5 shows the core elements targeted by our research questions. Other elements of the method will be addressed in connection with these core elements. At the same time, these core elements serve as the conceptual model through which we present our research.

1.3 Thesis structure

This thesis is organized into eight chapters in addition to references and appendix chapters. The current chapter outlined the research motivation and research question. The following chapter will explain our approach and why we believe that our research has been carried out according to acceptable scientific standards. In the process we will outline the adequacy of method construction as an instrument for theory development. Moreover, we will demonstrate how case study and piloting research are suitable research methods to construct a method. Finally, the third section in the second chapter will outline our success evaluation criteria.

The third chapter presents literature on IT sourcing and knowledge management. The chapter is divided into two sections, one for each topic. Each topic is first introduced in a general manner to outline the relevant foundations. The remainder of each topic highlights specific areas of interest in each topic. The literature review concludes with a summary of assumptions and constraints drawn from previous literature sources.

The fourth chapter outlines in detail how we used our research methods and how we followed the standards put forth by previous researches using these research methods. The first section of the chapter describes our case study research design, including the case selection criteria and analysis instruments. The second part of the chapter describes the piloting research design. Both research designs serve as the governing framework for conduction the empirical observations presented in chapter five.

The assumptions and constraints presented in chapter three will be challenged by our empirical observations in chapter five. The chapter begins with the presentation of data collected during our case study and continues presenting findings from our pilot research. Each of the two subsections starts with an account of the actual data collected and analyzed. This description is more extensive for the piloting data than for the case study data. The extensive description of the piloting research is warranted by the complexity of its two phase data collection process. In order to properly judge the changes of the proposed method the reader is provided with an account of how the mechanics of the method worked in the first piloting phase and which elements changed in the second piloting phase. The remainder of each section is organized according to the method construction principles outlined in chapter two. In particular each subsection contains a section on method principles, procedure, information and role model as well as a section on activities and techniques. Finally, each subsection will conclude with a summary section contrasting the assumptions and constraints collected during the literature review with the empirical observations.

Chapter five concludes with detailed claims we extracted from our data and used to formulate final requirements with regard to a knowledge transfer method for IT sourcing initiatives. This last section of chapter five provides answers to our research questions. Sections 5.3.1 and 5.3.2 demonstrate the factors influencing knowledge transfer activities in IT sourcing initiatives. Section 5.3.6 provides the answer to our second research question regarding which activities are relevant for knowledge transfer initiatives in an IT sourcing context. Finally, the sections 5.3.3, 5.3.4 and 5.3.5 provide a detailed account on how roles, activities and results interact to become a consistent method and therefore provide answers to our third research question.

The chapter six builds on our findings and proposes a theory matching the claims presented in chapter five. The theory is presented in terms of a method. Following this method presentation we will conclude this thesis by presenting our evaluation results, conclusions and limitations (chapter seven and eight). Finally chapters nine and ten list the reference literature and additional material such as raw data and interim results.

2 Approach

Most of the information system research literature establishes new findings by presenting empirical evidence that supports a specific model or a certain claim or provides evidence inside of a conceptual model. These findings are important because they allow researchers to focus on relevant aspects of information systems. Practitioners, however, need more than an abstract model such as a structural equation model to help them with their work. Quantitative results are not sufficient; practitioners need direct actionable advice based on qualitative findings in support of quantitative data. Naturally, the advice needs to be directed towards relevant problems, which justifies much of the empirical research. Nevertheless, the time it takes to derive advice from a research model is often too long for the practitioner him/herself. Constructive research methods have therefore been called upon to solve this problem (König et al. 1996). These research methods are capable of abstracting empirical findings into practical methods. Successful examples include the ITIL (OGC 2007), CObIT (ISACA 2007), PMBoK (Duncan 1996) or the CMMI (CMU 2008) methodological framework. Each of these methods provides methodological advice to practitioners by abstracting empirical findings and deducing actionable steps to improve a given situation.

In summary, we are employing a set of two qualitative constructive research methods to develop a set of claims (henceforth, referred to as "requirements"). These requirements will be implemented in a practitioner oriented theory (i.e., a method). Before formulating our final requirements, we will define a set of initial assumptions and constraints, based on a review of the literature. In order to reduce the biases of the research methods (e.g., pilot research may be too detailed and could result in a bias towards very specific organizational aspects triangulating with more abstract case research can mitigate this weakness) we will employ method triangulation (Paul 1996). The remainder of this chapter will first explain the concept of method construction and then will present method construction as a valid approach for building a practice focused theory. The last section of this chapter will explain our research evaluation criteria.

2.1 Method construction

Practitioners have employed methods for some time to summarize complex tasks and to execute processes more efficiently (Ittner and Larcker 1997; Kettinger et al. 1997). The use of methods as an appropriate mechanism to summarize theory has been established by Greiffenberg (Greiffenberg 2003). Therefore, we can be confident that methods become dual-use products. A method can be useful to practitioners for enhancing process efficiencies or effectiveness of complex tasks, as well as to researchers by extending existing theory.

The building blocks of a method-based theory have been suggested by Becker, Knackstedt et al. (Becker et al. 2001). The article established a common collection of elements for method construction, which was later extended and compared to alternative approaches (Braun et al. 2005). Such an analysis provides a framework for defining new methods based on these elements. Our knowledge transfer reference method will employ the method elements as presented by Braun, Wortmann et al. (Braun et al. 2005). The remainder of this section will explain the various elements of the methods pictured in Figure 2-1. The next section will discuss appropriate research methods for method construction.

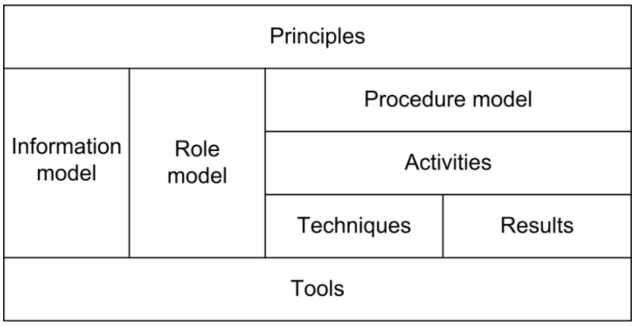

Figure 2-1: Constituent elements of a method based on Braun, Wortmann et al. (Braun et al. 2005)

According to the discussion on attributes of methods in Becker, Knackstedt et al. (Becker et al. 2001), a method is defined as a goal oriented, structured process designed along a specific set of principles. The goal orientation of a method is the criteria that measures the effectiveness or efficiency of the method. A structured process is the most prominent attribute of a method. The structure is described in terms of method elements. Finally, the design principles guide the method designer and help the method user to understand the method more easily.

The defined goal of our method derives from the initial research interest. Therefore, the success criterion of the method developed by this research will be the effectiveness by which knowledge transfer in IT sourcing initiatives can be performed when following our methods guidance.[3] The proxy to measure effectiveness will be practical usability (Ulrich 1988). Since the goal of our method is therefore firmly established, we do not need to research the subject further and can settle with this a priori goal description. Likewise the structure attribute is set

[3] The efficiency of the method itself is considered to be a separate research stream and is not covered by this work. We were able, however, to provide considerable cost reductions by the deployment of our method. Relevant data is presented in the deployment and evaluation chapter.

by our research motivation. As more structured and projectable guidance regarding knowledge transfer in IT sourcing transition processes is required by practitioners, this second method attribute is also defined a priori by our research focus.

The third method attribute specified by Becker, Knackstedt et al. (Becker et al. 2001) raises the specific importance of method principles in method deployment scenarios. Which principles provide adequate guidance for a knowledge transfer method in IT sourcing initiatives is not yet established. The methods principles, however, if properly explained, will enhance the user's understanding and acceptance of the method. Greater acceptance in turn often reduces the initial deployment tension and users are more likely to use the method as intended. Therefore, we will emphasize the method design principles throughout our method development and include them as an element of our research.

In addition to the method attributes, three models compose the principle groups of constituent elements of methods (Braun et al. 2005):

- The procedure model entails a set of rules linking activities with the role and information models. These rules ensure that activities are executed in the correct sequence and that the relevant roles are tasked with the activities. Furthermore, the rules make sure that all documents are prepared as required by the information model. A procedure model may have additional abstraction elements to group activities such as stages or phases. Visual representations of a procedure model consist of a variety of symbols, most frequently arrow shapes and lines. The activities themselves are the most complex constituent elements of a method, because activities are affected by all other constituent elements. First of all, they contain a set of techniques suited to produce predefined results. These results are defined as part of the information model. In contrast to this, the sequence of activities and the roles involved are defined by the procedure model. Therefore the procedure model specifies the conditions in which the activities are performed, and the activity itself specifies how the activity is executed in detail. Such an execution is described by a sequence of techniques useful for producing the predefined results. These techniques are usually following a specific stepwise process, starting with the input information of an activity to produce the defined output information as a result. Finally, the results of each activity conform to predefined document specifications that are defined by the information model. Each defined set of result documents needs to be prepared to finish an activity, since some or all results may be required by other activities as input information for certain techniques.

- The role model constituent element of a method defines rules regarding task responsibilities, reporting structures and resource competence. Each role defines the requirements a stakeholder needs to meet with regard to responsibilities, reporting and resource competence (compare (Thommen 2004). The interactions between roles specified in the procedure model and the performance criterion are part of specific activities, while the reporting structure remains part of the role model. Only stakeholders defined in the role model can participate in activities of the procedure model. Possible stakeholder types are individuals, organizational units and firms.
- The information model specifies the document standards of a method. For each document a set of input parameter is defined, which have to be provided to comply with the document specification. A set of rules is defined to specify how and which documents are linked, as well as which documents correspond to certain activities in the procedure model. Within the information model, document consistency is preserved in the same way that the procedure model ensures the consistency of activities.

Finally, tools may support the constituent method elements by helping with document exchange and data entry, as well as automatically coordinating the activities. Tools are strictly an optional method element. All activities of a method should be executable without tool support. However, IT tools, if well designed, may greatly raise acceptance levels and the method's efficiency.
In conclusion, we find that the constituent method elements represent a set of components to be defined by any method. Therefore these elements will become the categories of requirements to be collected and summarized in chapter 5.3. The next section will present appropriate means for collecting these requirements and, therefore, the tools for proper method construction research.

2.2 Appropriate research methods

In the survey on method construction research (Braun et al. 2005), we find four primary research methods to construct methods: action research, case study research, deduction and prototyping. Prototyping and action research are combined by Schwabe and Krcmar (Schwabe and Krcmar 2000) to become piloting research. In fact even Baskerville (Baskerville 1999) recognized prototyping as a form of action research. Therefore, we will use the adapted action research approach of piloting as the qualitative constructive research method.

Empirical methods will be employed to collect the data required for the constructive research. Our primary empirical research method will be the case study research method (Yin 2003). Not only have case studies been found suitable for method construction, they are also widely used in the field of IT sourcing (compare for example Lacity and Willcocks (Lacity and Willcocks 1998)). The case study research method, while often questioned regarding its scientific contribution by quantitative researchers, provides a well accepted framework for scientific theory development (Eisenhardt 1989; Lee 1989; Yin 2003).

In conclusion, we selected case study research and piloting research methods in order to collect requirements regarding the constituent method elements for a knowledge transfer method for IT sourcing initiatives. In particular, we defined a multi-case study that focuses on a dyadic relationship. A single IT sourcing case was analyzed as the unit of analysis. The following chapter will detail the exact research steps taken to realize the data collection and analysis.

2.3 Evaluation criteria

While evaluating quantitative data allows a claim to correctness, an applied research approach needs to be measured in terms of practical usability (Ulrich 1988). In the process of this research practical usability will serve as a proxy for effectiveness[4]. Therefore, we will evaluate our final research regarding practical criteria.

Our final results shall be evaluated regarding two dimensions. First, we will judge the novelty as compared to previous findings. In order to do so, we will first outline the literature that contributes to knowledge transfer methods in IT sourcing initiatives. After concluding our research, we will highlight elements that changed. Second, we will evaluate the practical usability by asking experienced employees in the field about the method's perceived practical usability in general, perceived problem solving capabilities of the method and whether they would suggest the method to a colleague or friend. In addition to this, we may receive comments regarding our work which we will include in our evaluation.

[4] Given the nature of our work based on action research, traditional effectiveness measures fall short to capture our contribution. Traditional effectiveness may be measured to test if a defined state in fact has been reached using a defined process. Given the breadth of our proposed method it proved to be impossible to recreate exactly the same environment to test the many processes in a statistically acceptable manner. Therefore we rely on human expert judgment regarding practical usability as a proxy for the methods effectiveness.

3 Literature review, assumptions and constraints

This chapter introduces the most relevant literature of IT sourcing and knowledge management related to our research. We present prior work in the field of IT sourcing and knowledge management, specifically with regard to knowledge transfer. Before summarizing this prior work, some research areas with lesser degree of importance to our work are be briefly mentioned.

We will not explicitly consider general project management literature in this literature review because our research perspective rests on a broader methodological basis whose results may apply to a variety of project management frameworks. However, a brief overview of the available research is warranted, acknowledging that some project management related concepts may emerge during our field phase. Recent project management literature roughly splits into research on knowledge management aspects related to the individual (Bresnen et al. 2005; Fernie et al. 2003; Koskinen et al. 2003), and another research branch focusing on knowledge management frameworks for project managers (Jyrki et al. 2003; Liebowitz and Megbolugbe 2003; Reich 2007; van Donk and Riezebos 2005). Based on our review[5] of the related literature the second research branch works towards understanding how knowledge management can become part of project management, rather than how knowledge transfer projects need to be managed. The first research branch focuses on the individual in more detail than our own research focus.

Another area our review will exclude is the continuous application of a knowledge transfer method. We are convinced that practitioners should decide, over time, which aspects of such a knowledge transfer method are suitable to apply in ongoing knowledge transfers in IT sourcing initiatives. While a study by Braun et al. (Braun et al. 2005) identifies two sources (Scheer and Baltzert) who call for repeatability as a required method attribute, but they are the only ones of the 12 sources surveyed. Therefore, repeatability is not studied as part of our research.

The following sections are divided up into two sets. Each set begins with theoretical background and then describes relevant details of the research field. The end of each section concludes with a summary regarding the constituent elements of a method. The following first section of this chapter is split into five sections covering the IT sourcing field. The second section of this chapter is also split into five sections covering the knowledge transfer

[5] Searching the archives of the Project Management Journal, a scientific publication associated with the PMI and the International Journal of Project Management, a scientific publication associated with IPMA for the term "knowledge" up to June 2007.

field. The chapter concludes with a summary of all literature findings and a set of assumptions and constraints based on the required method components of a knowledge transfer method in IT sourcing initiatives presented earlier.

3.1 IT sourcing related research

IT sourcing has been researched extensively. Given the scope of research in this field we have selected the most relevant sources with regard to knowledge transfer specifically during the IT sourcing transition phase.

We begin by tracing IT sourcing to the classic economic foundations of sourcing and firm size decision in the field of economics. In the process we describe the original strategic sourcing decision research which developed into an information technology specific research branch, IT sourcing. Following these foundations we provide an overview of the many design dimensions for IT sourcing. This is followed by research on some of the more successful choices in designing IT sourcing relationships. Before summarizing the details of this section we provide an overview of useful management models suitable for successfully designing and managing IT sourcing relationships. The management models presented provide findings from IT sourcing researchers as well as findings from the related field of strategic alliances. Strategic alliances in many aspects face similar issues, particularly with regard to the transfer of knowledge and have hence been studied as part of our literature survey.

3.1.1 Economic foundation of sourcing and IT sourcing

Sourcing is often described in terms of supplier management. Such a simplification may be flawed when the underlying economic theory is not well understood. Sourcing is essentially the implementation of a defined vertical boundary of a firm. It is the definition of the boundary that represents the strategic positioning of the firm along the value chain of its market. Therefore to reduce sourcing to managing a given supplier fails to recognize the importance (either high or low) of the vendor and the fact that the vendor may in fact be vertically integrated if costs are no longer acceptable. As a result, costs represent a practical tool to analyze vertical boundaries and sourcing. The specific theory of costs with regard to vertical boundaries has been established by Coase (Coase 1937) with significant contributions from Williamson (Williamson 1979). Williamson's 1979 article defines the transaction cost theory generally used today to analyze make or buy decisions, and it represents the framework we are using in our research[6]. Transaction costs are the sum (weighted by transaction frequency and uncertainty) of relationship-specific asset investments of both parties, including the costs to resolve resulting hold-up situations through contracting.

Both cost elements, direct, asset specific investment and resulting indirect hold-up costs, can be broken down into several elements. There are four types of relation-specific assets. These are either a given geographic location, a special physical feature of a product, a dedicated machine, or a specific human asset. Each asset-specific investment may give rise to quasi-rents, which an opposing party may try to transfer to its own profits by holding up a trading partner. To distribute quasi-rent a priori and to avoid unexpected behaviors, contracts may be specified between partners. However, contracting is costly. The contractual costs to mitigate hold-up situations can be broken down into costs from agency effects and costs resulting from the contractual agreement itself. Agency costs refer to costs incurred by convincing a partner not to behave opportunistically, but rather in alignment with the goals of the relationship. If a relationship displays large internal agency effects, they may actually become a relationship-specific profit, again giving rise to quasi-rents. Contractual costs arise if contracts have not been sufficiently complete because of bounded rationality, performance measuring inefficiencies, or asymmetric information. Mitigating each of these effects takes up managers' time and therefore incurs costs. The following will present the basic managerial decisions resulting from transaction cost theory.

According to the decision tree by Besanko et al. (Besanko et al. 2004), four conditions need to be met before managers should consider using the market to source a service or product.

- A capable supplier needs to exist in the market.
- The relation-specific assets need to have a low value (e.g., low specific investments in machinery required by the relationship), no intense coordination should be required (i.e., low interaction frequency between the transacting parties), and the risk of leaked intellectual property should be small (e.g., based on the future value of the information).
- The contractual negotiations should be cheap and easy; i.e., not more than about one percent of the total contract value according to a study by Mathew, Callow et al. (Mathew et al. 2007).

[6] Though Coase provided the initial theory, Williamson made it usable by providing a conceptual model. Though Williamson already references transaction costs in his earlier article in 1973, "Markets and Hierarchies: Some Elementary Considerations," it is not until the 1979 article that a conceptual definition is given.

- If the contracting is difficult, but no common ownership is required, the market may be used for sourcing, or a rigorously defined non-ownership agreement should be reached.

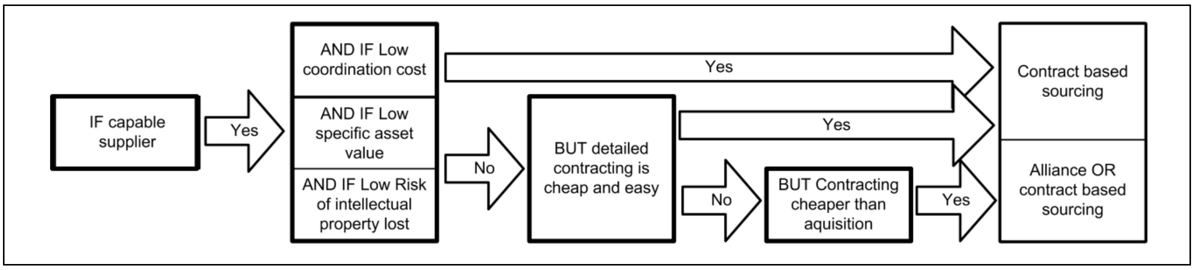

Figure 3-1: Sourcing decision model adapted from Besanko et al. (Besanko et al. 2004)

Sourcing can also become a strategic initiative independent of the vertical boundary perspective. To develop a more fine-grained understanding, Venkatesan (Venkatesan 1992) suggested selecting specific production families for outsourcing based on the general framework of transaction costs. The selection process included five selection criteria, each of which tested for strategic importance, and therefore a rationale not to source them externally:

- A production family should significantly contribute to perceived customer value.
- The specific investments in the production process should be high.
- The investments should result in significant innovation potential to enhance or build a strategic leadership position of the firm.
- The innovative production processes should be based on emerging technology to enhance the opportunities for future volume growth and therefore larger returns from the leadership position.
- The company should possess competitive capabilities to perform the production process much better than any possible supplier, or at least be able to reach such a capability with a reasonable investment.

This selection process allowed managers to choose sourcing opportunities more carefully within the transaction cost framework. By ruling out the most critical business areas, managers could focus on individual production functions that could be sourced without deteriorating the strategic position of the firm. Only a few years later, the concepts of capabilities and perceived customer value were extended by the resource-based theory of Quinn and Hillmer (Quinn and Hillmer 1994). The resulting sourcing advice was both transaction cost theory-oriented and resource-based in its focus on core competencies of the firm. As a result, the sourcing decision became a two-dimensional function of capabilities to provide perceived customer value and the degree of strategic risk, uncertainty, and ultimately vulnerability. Both capabilities and uncertainty therefore represent the fundamental dimensions to be considered for sourcing initiatives.

This paragraph will now pick up the earlier argument on transaction cost theory and use it to describe relationships within the IT business function. IT sourcing features transaction cost economies, as Aubert (Aubert 2002) found in his survey of US companies. In contrast to previous work by Ang and Straub (Ang and Straub 1998), who established transaction costs to be only one of many factors in IT sourcing initiatives, Aubert (Aubert 2002) established how the various transaction cost elements relate to the level of IT sourcing. To summarize his results, uncertainty seemed to be one of the most consistent deterrents of IT sourcing. This finding was recently reconfirmed by Gellings and Goo et al. (Gellings 2007; Goo and Na 2007). Asset specificity, while the strongest deterrent in the model, depended heavily on the type of service being sourced. The variation in the asset specificity measure may also explain other results obtained by Nam et al. (Nam et al. 1996). Their overall assessment of factors that influence outsourcing service level showed that asset specificity was insignificant, whereas uncertainty and tacit IT knowledge were significant factors. This assesment also examined which determinants influence re-contracting of IT services. The authors further establish asset specificity to be a significant factor in the initial IT sourcing decision only if the IT was used as part of a differentiation strategy. Moreover, the article concludes that much of the asset specificity for IT sourcing can be found within tacit knowledge. Together, these results suggest that the transaction costs of IT sourcing depend on contracting costs and asset specificity. In specific, the asset specificity in IT sourcing relationships seems to be largely based in tacit knowledge. Though the asset specificity in IT sourcing initiatives has been defined, the contractual costs remain less clearly defined. The next section will therefore outline design dimensions useful for structuring IT sourcing contracts.

3.1.2 Design dimensions of IT sourcing

To continue developing the subject of IT sourcing, this section will focus on the design dimensions of IT sourcing in general and contract design in particular. In order to describe the complexity of IT sourcing, consider the IT sourcing dimensions summarized by Jouanne-Diedrich (Jouanne-Diedrich 2004) and shown in Figure 3-2. Three of the design dimensions presented here (location, degree of service depth and service scope) can be matched directly to transaction cost asset specificity, whereas the remaining five relate to contract terms, suggesting that more design dimensions are available to manage the contracting costs in IT sourcing initiatives than limiting asset specificity in the first place to reduce hold-up risks. Notable two classic hold-up mitigation devices, number of service providers (e.g., improving ex post bargaining position of client or allowing operational hedging) and contract length (e.g., permitting more frequent contract renegotiation if required), can be identified. However, considering two additional aspects specific to IT sourcing, not included in the following illustration, namely physical or human asset transfers, more management options become available. These factors, while related to asset specificity, are usually also an important part of the contracting process, which further underscores the importance of contracting activities for IT sourcing initiatives. In fact even the simplified IT sourcing dimensions presented below allow for many hundreds of IT sourcing configurations, each with different characteristics. In order to judge these characteristics more adequately, we will present each one of the eight design dimensions in the following paragraphs.

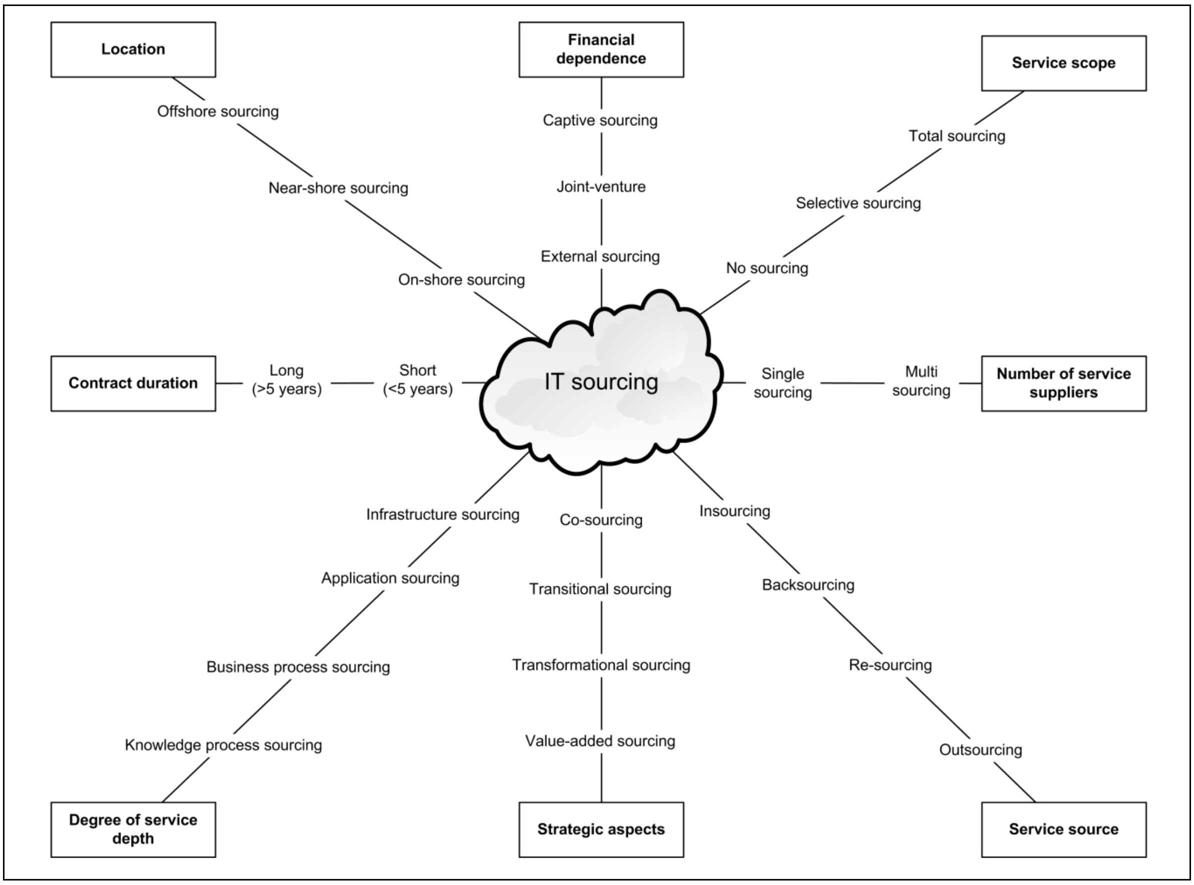

Figure 3-2: IT sourcing dimensions adapted from Jouanne-Diedrich (Jouanne-Diedrich 2004)[7]

[7] Modifications apart from the translation include changing "timing" to "Service source" and reordering the concepts, switching the position of strategic aspects and number of service suppliers, as well as renaming "Total Insourcing" to "No sourcing".

The relationship of financial dependence determines how a given contract structures financial ownership of the relevant assets. Traditional outsourcing is classified as external sourcing and it exposes the client to the smallest financial risk. In fact a client may often want to sell his or her own IT infrastructure to an external service provider. These restructuring initiatives can often improve financial results in the short term. In this situation an external supplier provides all the services and owns the entire infrastructure. An intermediate solution is represented by a joint-venture type agreement such as the Systor joint-venture of Perot Systems and UBS. In a captive sourcing arrangement, the supplier provides the service according to service level agreements (pre-define measures of an IT service that need to be met by the provider, commonly abbreviated SLA) using their own workforce, but the client provides the tangible assets such as IT systems and buildings, and in some cases retains legal ownership of the supplier. In essence most captive sourcing situations correspond to the management of an IT business function within a company based on internal markets. In any case, a captive sourcing solution is highly specific to one firm and caters to one client only and therefore corresponds to the greatest financial dependence.

The service scope is represented by how many services are managed by an IT sourcing initiative. The most fundamental approach is not to source any services and just leave the IT department as it is[8]. The intermediate solution - highly recommended (Lacity et al. 1996) - is selective sourcing. A selective IT sourcing contract may purchase services based on a needs analysis, even allowing internal IT departments to compete for some services and external vendors to compete for others. The most comprehensive IT sourcing scope represents a total sourcing initiative. These types of IT sourcing arrangement allow the client to receive the entire IT business function from an external vendor. However these contracts require thorough contract management, and clients often need to train their employees specifically in the terms of the contract and on how to liaise with the vendor at different levels (Bourn 2000).

Usually the number of suppliers is exactly one. Single sourcing remains popular, even though extensive literature suggests that multi-vendor agreements are better (Lacity and Willcocks 2001); some of the studies even provide migration paths from single vendor solutions to multi-vendor agreements (Gallivan and Oh 1999). Multi-vendor agreements, however, still seem to show one lead supplier with one or more sub-contractors, as exemplified in one recent contract that moved from a single to a multi-vendor contract (Mathew et al. 2007).

[8] At least no significant proportion. Some authors suggest a cut-off value of 80 percent. Sparrow, E. 2003. *Successful IT Outsourcing: From Choosing a Provider to Managing the Project (Practitioner Series)*, 1 ed. Springer.

Thus, truly competitive multi-vendor agreements seem to be the exception. While single vendor contracts are easier to coordinate, multi-vendor agreements are expected to guard against the risk of opportunistic behavior by the vendors. Furthermore multi-vendor contracts permit subcontracting to the most able supplier in each service area. Such subcontracting agreements have recently become more frequent (GKB 2005; Mathew et al. 2007). With the consolidation of the IT sourcing market (see introductory chapter) and the appearance of more specialized vendors on the market, the multi-vendor IT sourcing approach may become more important in the future (Gallivan and Oh 1999).

The source of a service implementation initiative may be either internal or external. If a new service is provided internally, we refer to this IT sourcing initiative as insourcing (derived from "internal sourcing"). The term is often misused by organizations trying to fill up excess capacity by offering their services erroneously as insourcing, when it is in fact an outsourcing offering. In contrast, backsourcing is the transfer of an externally sourced service back to an internal delivery organization. Examples of large backsourcing initiatives include the Perot System-UBS contract mentioned earlier. However, these initiatives tend to be expensive and infrequent. Operation costs in particular can be significantly higher after a backsourcing initiative than before the initial outsourcing (Hirschheim et al. 2006). Yet another contract change is called re-sourcing. Re-sourcing is the switch from one IT sourcing vendor to another. As the market becomes more mature, such vendor switches are expected to become more frequent. For example the Migros Bank, an intermediate-size Swiss retail bank, recently announced a switch in their core banking provider (Netzwoche 2007). Finally, the outsourcing initiative represents an approach for handing over IT services to a supplier. While the market volume for outsourcing is still rising, the relative growth of the market is declining (OVUM 2006). Therefore pure outsourcing may become less frequent than re-sourcing in the foreseeable future.

Strategic considerations of IT sourcing involve assessing the business impact of a given IT sourcing contract. The smallest impact results from co-operation sourcing, which, like captive sourcing, is performed jointly with the service provider, but in contrast to captive sourcing, the vendor may actually be an external party not controlled by the client. Usually these IT sourcing agreements end after certain projects have been accomplished. Transitional IT sourcing defines a category of initiatives targeted to replace certain technical systems with new ones. In contrast transformational IT sourcing defines initiatives where business processes are changed. Finally, value-added outsourcing defines a partnership designed to reach a common strategic goal like gaining a leading market position or selling a new product. These types of IT sourcing initiatives are extremely rare, but managers often classify their projects as such, because they may mistakenly believe that the mere existence of a business case arguing for outsourcing adds value to their companies' growth potential. This overuse of the term makes this particular category largely useless as an empirical instrument. However, the category is important in outlining the possible impact levels of IT sourcing.

The service level depth determines to what extent a service provider needs to interact with a client. The least interaction is required for fairly simple infrastructure services including networking, desktop services, or even facility services. The next higher interaction level is application sourcing, and it includes application maintenance and application development. The latter requires even more interaction with the client than the former. The process of gathering requirements as part of the software engineering process across firm boundaries and cultures involves overcoming many communication problems. Therefore it is more difficult to achieve than simply learning how to maintain an existing system (Carmel and Tjia 2005). Furthermore, the level of interaction in the application sourcing category varies, depending on whether it involves custom legacy systems or standardized solutions from companies like SAP or Oracle. Even more complicated are IT sourcing contracts involving entire business processes. While the underlying IT infrastructure and application landscape can be defined from scratch, the numerous satellite interfaces for the different business processes make this type of IT sourcing initiative difficult in practice because the lack of industry standardization – especially across different generations of IT systems- with regard to application interfaces, data schemas and system management procedures (Wullenweber and Weitzel 2007; Zollo et al. 2002). In addition, stakeholders on the client side and their sometimes unclear demands can increase these difficulties. Finally, knowledge process sourcing involves skilled labor tasks performed by an external entity. Outside the IT field the pharmaceutical industry has outsourced some phases of the research and development process for drugs, particularly the stages of testing and clinical efficacy and financial service firms often employ outsourcing providers to update financial models and to conduct dedicated research tasks (e.g., uncovering off balance dept or adjusting stock levels between different accounting methods). Similar approaches are now expected to emerge in the IT sourcing field. However, the benefits are elusive. These services, in addition to the numerous interactions required, suffer from a high degree of ambiguity. Supplier organizations hope to standardize some of the more knowledge-intensive services in fields such as human resource management, product development, and finance in order to raise overall margins in the general business of outsourcing. It is unclear how the current literature differentiates knowledge sourcing from consulting except for the trivial, "general business" services like translations, graphics design, accounting, and clerical work.

The duration of a deal is an important aspect of the contract between client and vendor. Vendors need enough time to run a profit through consolidation and scale effects in order to avoid falling victim to the "winner's curse" after winning the contract (Kern et al. 2006). Clients need to have enough flexibility to modify contracts according to business needs and to switch vendors if the performance deteriorates. Lacity and Willcocks (Lacity and Willcocks 1998) noted that shorter contracts are more likely to be successful.

Finally, the geographic location is important in affecting the culture and the control that the client can impose on his or her outsourced IT operations. While offshoring - provisioning of services usually in Asia - dominates much of the media, it is by far the smaller part of the outsourcing business (OECD 2007; TPI 2007). The domestic IT sourcing business is far larger (OECD 2007). The intermediate solution is near-shore sourcing, in which developed economies contract services from nearby countries with lower wage and infrastructure levels. This type of outsourcing has been gaining momentum lately throughout Europe, though it is still smaller than the offshoring of business to Asia or even the only emerging offshroing business to Africa (OECD 2007).

Having established the dimensions of IT sourcing contracts, we will continue the next section with recommendations regarding contract design by researchers and practitioners.

3.1.3 IT sourcing success criteria and contracting recommendations

IT sourcing success has often been linked to cost savings. One of the most cited studies (Lacity and Willcocks 1998) has used this single criterion to define success. However, service quality has previously been identified as a success factor (Grover et al. 1996). More recently Rouse et al. (Rouse et al. 2001) introduced a more robust three-item IT sourcing success scale: degree of cost savings, degree of service improvement, and degree of realized benefits. While the former two success measures directly measure vendor performance, the last measure largely depends on the client. Clients who fail to recognize their responsibility in making an IT sourcing initiative successful are not likely to find IT sourcing worthwhile. Therefore in addition to the contract recommendation in this section, we will present IT sourcing models that may help clients better manage a relationship by investing in IT sourcing management models. Furthermore, the cost and service quality vendor success criteria have since been validated in several studies (IBM 2005; Landis et al. 2005).

Contracting recommendations are abundant but few are as well researched as those by Lacity and Willcocks (Lacity and Willcocks 1998). Therefore we will focus on these recommendations in this section and include only select additional sources regarding contract renegotiation. Lacity and Willcocks (Lacity and Willcocks 1998) draw on a set of 61 IT sourcing decisions in both US and UK firms, leading the authors to propose eight recommendations for the contract stage. The authors:

- recommend outsourcing selectively, in line with earlier work presented above (Quinn and Hillmer 1994; Venkatesan 1992).
- recommend to consider various political dimensions, such as building consensus regarding IT sourcing with business and IT managers.
- recommend on requesting internal bids in addition to the external vendor offer. These practices can increase staff acceptance of IT sourcing initiatives and may actually help to keep a service internal.
- recommend a fee-for-service contract.
- recommend a contract duration long enough for the service provider to enjoy a good profit margin.
- recommend to design contracts with options for frequent renegotiation.
- recommend to include a flexible performance incentive and a correction for the downward pressure on prices as technology allows for ever cheaper service delivery.
- recommend against conducting large-scale IT sourcing in the beginning, but rather selecting pilot projects and then growing IT sourcing operations continuously.

The re-negotiation in particular is becoming more important within the contracting literature. A notable article by Nam et al. (Nam et al. 1996) highlights determinants for successful re-contracting. The authors conclude that the lower the degree of IS business function substituted by the vendor and the greater the importance of the IS applications being sourced, the more likely a client is to re-contract with the incumbent supplier. Furthermore, opportunistic behavior and low client satisfaction has been shown to have strong negative effects on re-contracting. In addition, at a higher (perceived) degree of related knowledge and a less certain outcome for the deal, clients may let vendors take control of fewer services.

3.1.4 IT sourcing management models

To maintain contractual obligations and deliver high-satisfaction services, IT sourcing process models have been developed. Many such process models focus heavily on vendor selection (Hite 2003; McIvor 2000; Quinn and Hillmer 1994; Wu et al. 2005). The only comprehensive and empirically grounded IT sourcing model is provided by Cullen et al. (Cullen et al. 2006) and is pictured in Figure 3-3. The author's model consists of four phases and eight processes. Phase one is composed of the processes to investigate, target, strategize, and design the IT sourcing. The goal of the first phase is to archive a clear understanding of which services are to be sourced and what is expected from the service provider. The second phase then focuses on vendor selection and negotiation with the goal of finalizing the contract and preparing for the phase of IT sourcing operation. In the third phase the IT services defined in the contract are transferred as part of the transition process, and the initiative enters the manage process once the transition is complete. The fourth and final phase consists of the refresh process, designed to periodically review the sourcing agreement and eventually to initiate renegotiations.

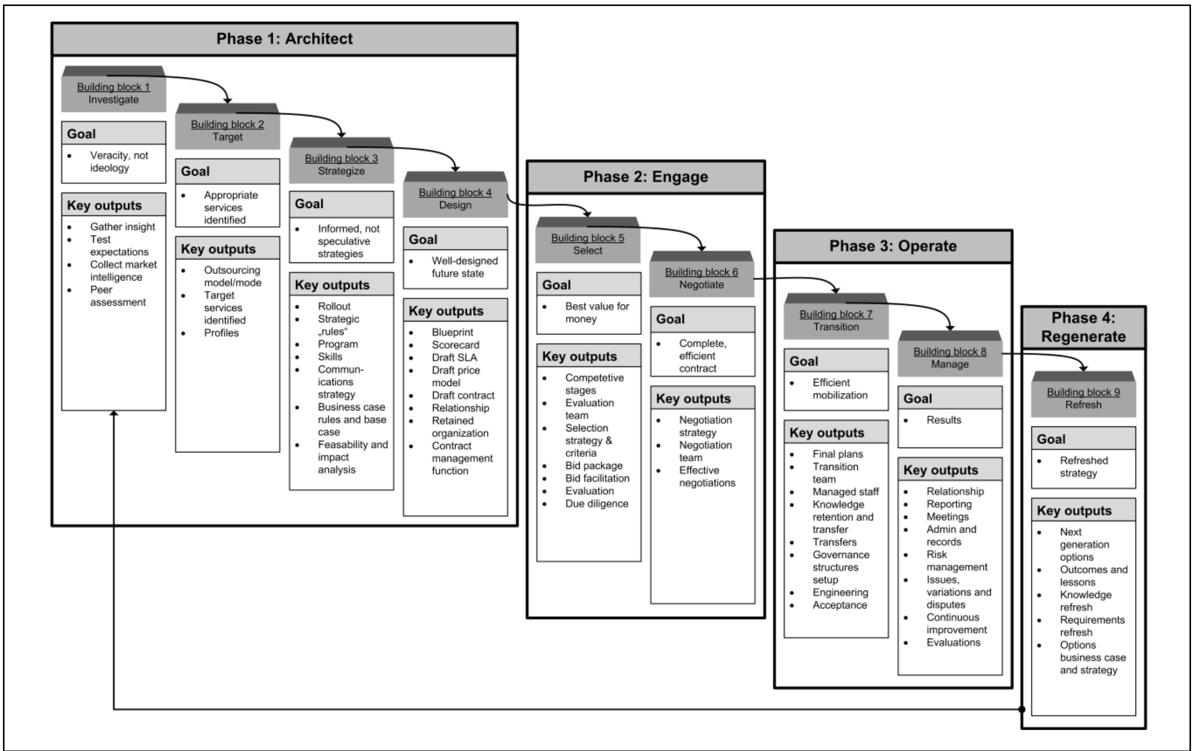

Figure 3-3: Outsourcing life cycle model reproduced from Cullen et al. (Cullen et al. 2006)

As we have outlined earlier, the first and second phase, as well as the manage process of the third phase, are covered extensively by the existing literature. Following the logical execution sequence, we are first focusing on the on the transition process aspects before reviewing the manage process.

Practitioners single out the transition process as quite important in the IT sourcing process (Mathew et al. 2007). As noted earlier, they also describe this phase as the most expensive in the IT sourcing cycle (Overby 2003). These are strong indicators that the transition process requires more than simply execution of good plans drawn up in the earlier IT sourcing phases. One participant quoted in Cullen et al. (Cullen et al. 2006) puts the description of the transition phase in following way: “the rubber hits the road.”

Using findings from literature on alliances as an indicator of the difficulties during the transition process, as suggested by (Gallivan and Oh 1999), one particular problem emerges. Knowledge transfer in the past was found to be difficult and expensive in numerous alliances (Hamel 1991; Inkpen and Dinur 1998; Mowery et al. 1996; Murray 2001; Simonin 1999). Not only has knowledge transfer been identified in alliances, several authors embed it within their IT sourcing management models, as we will explain in the following paragraph.

We briefly present three IT sourcing relationship management models that refer explicitly to knowledge. The first summarizes aspects specific to relationship management drawn from 16 lessons learned by Willcocks and Lacity (Willcocks and Lacity 2006b). This model also divides nine IT sourcing core capabilities (Feeny and Willcocks 1998) into four key activities of relationship management for clients and vendors (see Figure 3-4). The authors found that clients should retain certain key knowledge usually relating to the system architecture of their information systems. Additionally, the client has to manage personnel changes at the vendor and be prepared to handle different liaisons over time. In order to manage this change a role needs to be specified on the client side who liaises with the vendor and monitors the contract thoroughly. For their part, vendors should focus on staff retention and the skill levels of staff brought onto a contract. Nurturing the relationship with the client is essential if the deal is to be successful. Moreover, vendors need to educate the client on exactly which goals, schedules, and prices are realistic, and which will result in losses for the vendor. Once these goals are agreed upon, the vendor is required to deliver the results rigorously as specified. Furthermore, the authors recommend that the relationship should be balanced in order to prevent any party from profiting in ways not previously agreed upon. In fact the authors suggest that the nine capabilities outlined in their research be used to retain knowledge in these particular capabilities in order to ensure that proper vendor management skills remain with the client organization.

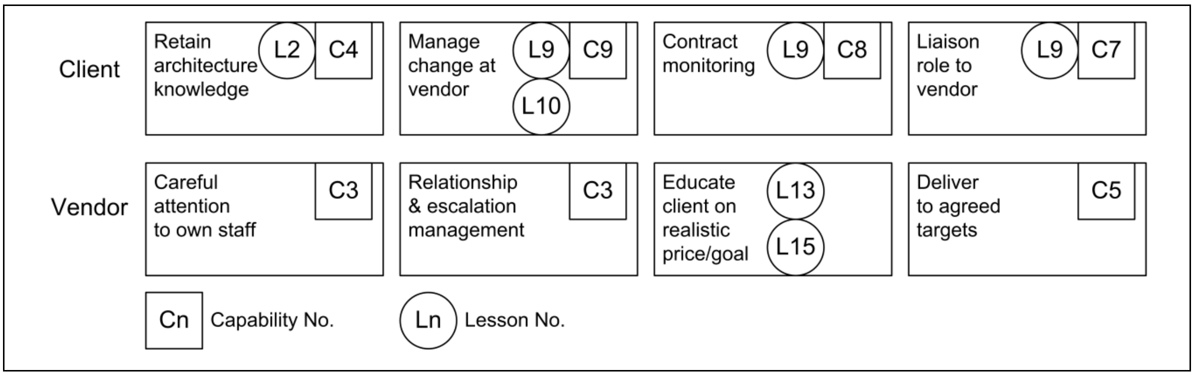

Figure 3-4: Mapping lessons and capabilities to management activities, based on (Feeny and Willcocks 1998; Willcocks and Lacity 2006a)[9]

The sourcing capability model (hereafter SCM) to lead the IT sourcing management process developed by Hyder et al. (Hyder et al. 2004a, b) and William et al. (William E. Hefley and Loesche 2006) includes a total of six continuous vendor capabilities and nine continuous client capabilities[10]. In the SCM, both vendor and client should manage capabilities related to knowledge, people, relationship, technology, and threats. In addition, the vendor should also conduct performance management. The client, in contrast, should run a total of four additional management capabilities, notably sourcing strategy management, governance management, value management, and organizational change. While other IT sourcing models either disregard knowledge transfer activities or recognize only knowledge transfer towards the receiver organization (usually the IT sourcing vendor), SCM was one of the first models to include it as part of a contract termination activity.

The third IT sourcing management model is based on a psychological contract perspective (Koh et al. 2004). The model focuses on mutual, non-legal agreements between the employees of the IT sourcing parties. The model provides a way to manage incomplete contracts, which are thought by some researchers to be more effective (Fehr et al. 1997). The recommendations of Koh et al. (Koh et al. 2004) are described in terms of client and vendor obligations. Clients are supposed to provide clear specifications, prompt payment, and effective management of its own workforce. In addition, clients are asked to assume project ownership and rigorous monitoring, as well as transfer the relevant knowledge to the vendor where required. The vendor, for his or her part, should share knowledge effectively with the client and build inter-organizational teams while maintaining a clear authority structure. In addition, a vendor should properly outline a project scope to the client and manage his or her staff resources with the appropriate dedication. Finally, a vendor should take charge and work as independently as possible.

[9] See the referenced literature and the respective lesson and capability number for details.
[10] The model also contains a series of temporal capability areas not presented here.

3.1.5 IT sourcing summary and identifiable method elements

In conclusion, we found one comprehensive IT sourcing procedure model with a series of activities and results, developed according to scientific principles (Cullen et al. 2006). A second IT sourcing model has been developed by practitioners (Hyder et al. 2004a, b); (William E. Hefley and Loesche 2006). Both contributions outline many elements of a method. The model outlined by Cullen et al. (Cullen et al. 2006) shows a procedure model; i.e., a set of activities with named results. However, detailed techniques are not described and a role model is missing. Furthermore, a consistent information model specifying the result documents has been omitted from the publication or has not yet been developed. The practitioner IT sourcing model is more complete and provides procedure model, activities, and techniques, even going so far as to suggest process indicators. However, as with the academic proposal, no role or information model is provided. Without these defined results, users will find it difficult to implement these models, which do not yet qualify as methods. Moreover, these models only present limited activity collections. While several such activity collections exist in the literature (e.g., (Chini 2004; Kazi and Wolf 2006)), the above models largely omit any particular activities. However porous the existing models may be with regard to a suitable IT sourcing knowledge transfer method, their existence shows that any such method should be well structured in principle. The same conclusion can be derived from the apparent benefit of routine development for alliances proposed by Zollo (Zollo et al. 2002) and the critique of firms lacking operational structure in IT sourcing initiatives by Power (Power et al. 2004). Furthermore, Lee (Lee 2001) reports in his study of Korean firms, Callow and Gauld (Callow et al. 2006) report from the UK and Levina and Ross (Levina and Ross 2003) as well as Feeny and Willcocks (Feeny and Willcocks 1998) report from a vendor perspective that a structured process is beneficial for IT sourcing in general. Even more, Lee (Lee 2001) and Balaji and Ahuja (Balaji and Ahuja 2005) stress its importance for knowledge transfer in particular.

Seemingly related – but different from a structured approach in that controls measure whether a given structure is followed – the existing literature is demanding to control the IT sourcing initiative. While some of the same authors calling for a structured approach to IT sourcing are also asking for a controlled approach (Feeny and Willcocks 1998; Power et al. 2004; Rouse et al. 2001), more specific calls for controlling IT sourcing through quantitative measures have been put forward by Verhoef (Verhoef 2005) and more recently emphasized by Gellings (Gellings 2007). This suggest, any IT sourcing method should consider a controlling principle as part of the method principles being formulated.

The demand for structuring and controlling method elements suggest that transparency should be established regarding goals and procedure of the IT sourcing initiative, except Tiwana and Cullen et al. (Cullen et al. 2006; Tiwana 2004) as well as Power et al. (Power et al. 2004) few authors are proposing to communicate goals and objectives to employees. Even fewer research is available on the impact and benefits of open book accounting described by Callow et al. (Callow et al. 2006) to increase the much needed financial transparency (Landis et al. 2005). The closest reference is earlier work by Simonin (Simonin 1999) which showed that excessive ambiguity (i.e., too little transparency) may negatively affect knowledge transfer between firms.

Apparently in contrast to the wealth of literature suggesting well structured and controlled IT sourcing knowledge transfer executions, derived from the transaction cost theory, some authors proposed aspects, derived from the theory of reasoned action as it is applied to an information system context (Bock et al. 2005). In particular aspects such as trust, motivation and participatory work reflect the reasoned action theory. Alborz et al. and Goo and Na (Alborz et al. 2005; Goo and Na 2007) propose in their analysis of IT sourcing initiatives that trust between IT sourcing partners is essential for IT sourcing success. Both authors argue that trust should be based on reduced uncertainty (i.e., contractual elements). In contrast, the psychological contract approach by Koh et al. (Koh et al. 2004) focuses on trust to bridge incompletely specified IT contracts and therefore would require a type of a priori trust (i.e., based on benevolence) rather than trust build over time (i.e., through a rational process). This apparent conceptual conflict is only partially resolved by Poppo and Zegner (Poppo and Zenger 2002) positing that trust in terms of relational governance and structure in terms of contracts are complements to achieve IT sourcing success. Restricting our argument on the scope our research (i.e., organizational issues rather than individual ones) we conclude that trust apparently is an important principle to be considered. However, we limit our perspective on the kind of trust either developed over time or established by rational means such as contracts.

The motivational aspects suggested in IT sourcing literature encompass primarily careful planning of career paths (Cullen et al. 2006), management of fees and incentives (Rottman and Lacity 2006) and inclusion of intrinsic incentives (Koh et al. 2004). These motivation principles do not differ much from general motivational theory proposed by (Herzberg 1968). Nevertheless, since these principles have been discussed by IT sourcing researchers they need to be considered in the context of our research objectives.

The final aspect frequently argued in IT sourcing literature refers to a cooperative, partner like approach to the IT sourcing relationship. Particularly Alborz et al. (Alborz et al. 2005) stresses the need for a cooperative approach and that both partners should be firmly committed to the IT sourcing initiative. Furthermore, research by Grover et al. (Grover et al. 1996) indicates the importance of the partnership quality for a successful IT sourcing initiative.

In conclusion, our literature review[11] did not provide us with a comprehensive knowledge transfer method for IT sourcing initiatives but yielded a selection of propositions which can be used to compose method elements. Such a finding is not surprising, given that earlier IT sourcing literature reviews already state that previous research has focused mainly on factors derived from positivist research and on contract studies involving interpretative research (Dibbern et al. 2004). Moreover, little empirical work with descriptive and interpretative approaches exists, even less so with regard to management models. Therefore our analysis is timely and a much needed contribution to the existing body of outsourcing literature. In Figure 3-5 we summarize the aspects mentioned in preceding paragraphs. In addition, the figure identifies aspects extracted from the IT sourcing management methods referred to in the previous section and relate these aspects to method element categories. While many authors have mentioned and explained the importance of knowledge management and knowledge transfer in IT sourcing initiatives, tangible assumptions and constraints regarding actual method constructions are more difficult to find, in contrast to the extensive literature on factors generally affecting the process. The following table will include only those method elements directly related to knowledge transfer.

[11] We reviewed approximately 170 academic and practitioner publications found through research on ISI Knowledge Web, Google Schoolar, Google Paten Search, and Business Source Premier using the keywords of "outsourcing", "IT outsourcing", "knowledge transfer" and the intersection of the last two queries, as well as examination of the reference results output. In addition we reviewed two refereed IT sourcing literature summaries (Beaumont, N., K. Zaffer. 2005. Taxonomy of Refereed Outsourcing Literature *Working Paper* Monash University, Dibbern, J., T. Goles, R. Hirschheim, B. Jayatilaka. 2004. Information Systems Outsourcing: A Survey And Analysis Of The Literature. *The DATA BASE For Advances In Information Systems* **35**(4). and two recent special issues on sourcing in general (Journal of International Management & Human Systems Management). These sources contributed little to our work. To the best of our knowledge the review we provide here reflects the state of the art and adequately summarizes the existing body of knowledge. Nevertheless, certain more general publications may be missing from our review.

Method element	IT sourcing literature findings
Principles	Structure: (Cullen et al. 2006), (Hyder et al. 2004a), (William E. Hefley and Loesche 2006), (Zollo et al. 2002), (Power et al. 2004), (Lee 2001), (Callow et al. 2006), (Levina and Ross 2003), (Feeny and Willcocks 1998), (Balaji and Ahuja 2005); Control: (Feeny and Willcocks 1998; Power et al. 2004), (Verhoef 2005), (Gellings 2007); Transparency: (Cullen et al. 2006; Tiwana 2004), (Power, Bonifazi et al. 2004), (Stephen Callow, Richard Gauld et al. 2006), (Kenneth M. Landis, Sommath Mishra et al. 2005), (Simonin 1999); Trust: (Alborz et al. 2005; Goo and Na 2007), (Koh et al. 2004), (Poppo and Zenger 2002), (McKnight et al. 1998); Motivation: (Cullen et al. 2006), (Rottman and Lacity 2006), (Koh et al. 2004), (Herzberg 1968); Participatory work: (Grover et al. 1996), (Alborz et al. 2005)
Procedure model	Provide synchronization with either the IT sourcing model of Cullen et al. (Cullen et al. 2006)or Hyder et al. (Hyder et al. 2004b) Plan knowledge transfer as part of the IT sourcing transition process; Start planning some time before transition; Consider alternative approaches such as the psychological contract: (Fehr et al. 1997), (Koh et al. 2004)
Role model	Source, receiver, contract manager by various authors; (Bourn 2000): business group head, director, board member each of client and provider; In addition (Cullen et al. 2006): Program manager
Information model+	(Cullen et al. 2006):Skill profile, retained organization; (Hyder et al. 2004b): knowledge-sharing policy, knowledge-sharing stakeholder, plan for managing the personal structure and capabilities; personnel competency inventory; (Mathew et al. 2007): Mandatory cooperation agreement
Activities	(Cullen et al. 2006): Identify skills and retained employees; (Hyder et al. 2004b): communicate knowledge-sharing policy, establish incentives for knowledge sharing, provide resources, create process for knowledge sharing, communicate actions, verify that work is done effectively, document work products and tasks required for delivering service; (Venkatesan 1992): identify components of product*, identify families of components*, split families in strategic and commodity*; (Quinn and Hillmer 1994): benchmark components/functions against possible suppliers on cost & benefits scales*
Techniques	(Hyder et al. 2004b): meetings, seminars (Mathew et al. 2007): Staff transfer, work shadowing; (Chini 2004): Capture and transfer, decision support systems, pointers to expertise, problem solving technology, chat groups/web-based discussion groups, analogies and metaphors, team collaboration tools, databases, web-based access to data, intranet and internet pages, best practices and lessons learned, face-to-face meetings, learning-by-doing, learning by observation, on-the-job training, apprentices and mentors, subsidiaries projects, brainstorming camps, employee rotation.
Results	None
Tools	(Hyder et al. 2004b): databases, intranet, bulletin boards

+ None of these documents was described in detail. Thought the documents were only mentioned, the source articles usually included recommendations the structure and content. * Wording adapted from original author

Figure 3-5: Summary of knowledge transfer method assumptions and constraints gathered from IT sourcing literature

The summary in Figure 3-5 show that the IT sourcing literature regarding transition process management and IT sourcing management in general has so far proposed valuable suggestions for principles and activities. Many of the activities identified will probably lead to a specific result and therefore in a given document. However, the preparation of these documents is usually not described. Furthermore, the activities related to knowledge transfer are inconsistently distributed through the models, without guidance about when and how to implement them. Furthermore, practitioner publications provide more on method construction than scholarly ones. The sparse suggestions for tools are generic, as are the suggestions of techniques. Since there is insufficient knowledge transfer advice in the IT sourcing literature, we will present specific literature on knowledge management and knowledge transfer in the following sections.

3.2 Knowledge management related research

Based on our research questions, we focus on method-related, organizational aspects. Therefore, we begin to present fundamental research on knowledge management in general before focusing on knowledge transfer. Following this, we have structured the relevant sources on knowledge transfer in two main sections. One section covers sources on knowledge transfer within firms and another describes research on knowledge transfer between firms. An additional section covers a selection of knowledge transfer activities and techniques. These activities and techniques were prevailing in knowledge management literature and are an addition and extension to the earlier sections.

In contrast to the organizational perspective of our research, aspects of culture and individual character are excluded (i.e., we do not consider any cognitive psychological aspects like learning which differ from organizational knowledge transfer (Argote et al. 2000)). Some authors have argued that culture is important in knowledge transfer (Balaji and Ahuja 2005; Haghirian 2003; Sarker 2002), as well as the IT sourcing context (Balaji and Ahuja 2005; Carmel and Tjia 2005; Cummings and Teng 2003). However, authoritative sources (Dixon 2000), while considering the existing knowledge culture as helpful, conclude that a shared knowledge culture is in fact not required, but can establish itself over time once the knowledge transfer begins. Since our method excludes these aspects, our literature review will mention the issue only occasionally when required to contrast or reflect on other findings. Furthermore, our literature review will not explicitly consider the smaller field of knowledge sharing. Knowledge sharing is not directed and therefore not suitable for a strictly directed IT sourcing process such as the IT sourcing transition.

Similarly, the knowledge transfer method being developed in this research will refrain from managing certain organization-specific environmental pre-conditions. These pre-conditions have to be established prior to starting a knowledge transfer, according to the knowledge transfer method for IT sourcing initiatives developed as part of this research. Specifically we adopt similar demands as Davenport and Prusak (Davenport and Prusak 1997): an established technical infrastructure of information systems and knowledge management, as well as human resource and IT sourcing roles; senior management support, including clearly defined schedules and assigned resources; a business rationale for the IT sourcing initiative, including a business case in favor of the knowledge transfer; motivational aides, including long-term career development targets and financial sanctions and benefits (at the level of either the individual or the firm).

3.2.1 Knowledge management foundations of knowledge transfer

In order to position knowledge transfer we will briefly consider the knowledge management framework of Probst et al. (Probst et al. 1999) as introductory starting point, followed by an overview of knowledge types. The last part of this section will consider a psychological framework relevant to knowledge transfer research.

In consensus with other authors, Probst et al. (Probst et al. 1999) define knowledge as contextualized information. The authors go on to propose a reference model composed of eight building blocks (Figure 3-7), each dedicated to a particular process identified during their field work.

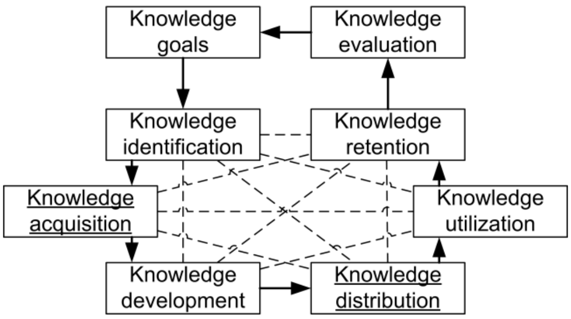

Figure 3-6: Knowledge management process model (Probst et al. 1999)

The two top-most processes are usually of strategic importance. The definition of knowledge goals allows firms to direct knowledge management initiatives. Knowledge goals in resource-based companies are usually derived from core competencies (Quinn and Hillmer 1994) – either future ones to be developed, or current ones to be maintained. These goals represent a measure, against which knowledge management initiatives can be assessed. The knowledge evaluation process is designed specifically to establish tools and methods to assess the progress and therefore initiate a new knowledge management planning cycle. As with any management process, this monitoring function is necessary to allow for adjustments and modifications of a knowledge management initiative.

Once the knowledge goals and relevant metrics are defined, the knowledge identification continues. This process involves ensuring sufficient transparency for knowledge to be identified. It is important to be able to find relevant information and data in order to form identifiable knowledge units to match knowledge goals that can then be acquired by an individual or organizational unit. Knowledge acquisition refers to activities for improving the knowledge within the company either from interaction with partners, suppliers, or customers. Mergers and acquisitions may also provide a company with relevant new knowledge. Complementary to the knowledge acquisition, knowledge can and needs to be developed within the company. The development of knowledge entails the creative process of connecting several knowledge assets to build new knowledge and to distribute that knowledge to other workers. Such a distribution is essential if the knowledge is meant to be reused and to provide value inside the organization. However, too much knowledge may overwhelm individuals. Therefore, it is important to identify who needs which knowledge item. Some organizational units may resist knowledge not developed by them; they may perceive the knowledge as rivaling their own and therefore threatening their legitimacy and competence. Consequently, firms need to develop knowledge reuse skills of their employees and in some cases try to enforce its reuse wherever errors are too costly to be repeated. For example, it may be too costly for firms to allow each new member of a software development team to discover for him/herself that not running proper tests on software code will result in flawed software causing thousands of customers to lose data and sue the firm. Finally, firms need to maintain knowledge for a certain period, even if it is used infrequently. This process of updating and maintaining knowledge needs to be managed deliberately. It is often difficult to maintain knowledge, since this often requires repetitively transferring knowledge from one medium to another. More exciting activities may include training exercises modeled on those used by security forces or military personnel, who train in this way to ensure their readiness for infrequent events such as war or contamination scenarios.

While the knowledge management process model by Probst et al. (Probst et al. 1999) relates to knowledge management within the company, the specific transition of knowledge between economically relevant entities (either individuals, organizational units or firms) is best referred to as knowledge transfer. In contrast to cognitive psychology the knowledge transfer phenomenon considered in strategic management research does not focus on outcomes on an individual level but on the outcome of the firm level (Argote et al. 2000).

In an inter-company situation such as IT sourcing, two processes can be invoked, one for each firm participating in the knowledge transfer. One firm may perceive IT sourcing as acquiring knowledge, while the other may perceive it as distributing knowledge (note the underlined processes in Figure 3-7). Which process is invoked during an IT sourcing transition process depends on the source of the IT sourcing service[12]. In general the receiver organization usually executes knowledge acquisition and the source organization, knowledge distribution (see Figure 3-7 for an overview). How these processes are managed and which factors influence them, based on prior research, will be presented in the following sections. This section will continue with an overview of knowledge types of interest in this research.

IT sourcing service source	Source organization (Executes knowledge distribution)	Receiver organization (Executes knowledge acquisition)
Outsourcing	Client	Vendor
Re-Sourcing	Vendor	Vendor
Backsourcing	Vendor	Client

Figure 3-7: Source and receiver organization of knowledge depending on IT sourcing type

In the past scholars have identified several types of knowledge . A modern conceptualization of knowledge was proposed by the philosopher Polanyi (Polanyi 1966). The discipline of economics has provided additional definitions and specializations (Spender 1996), and the discipline of sociology has contributed through the work of Willke (Willke 2001). For the purposes of our argument, Polanyi's differentiation between tacit[13] and explicit knowledge will be used (Polanyi 1966), with each type of knowledge further divided into individual or organizational subclasses of knowledge (Spender 1996). Tacit knowledge is defined as knowledge embedded in an individual (Polanyi 1966). Therefore tacit knowledge is highly contextualized. Explicit knowledge refers to all knowledge that can be recorded by any means. These concepts have been further developed by Nonaka and Takeuchi (Nonaka and Takeuchi 1995) and enhanced by the organizational categories. The organizational categories can be summarized with the categories of individual- and firm-level knowledge. Drawing on these different types of knowledge and their organizational attributes, Nonaka and Takeuchi (Nonaka and Takeuchi 1995) describe the spiral of organizational knowledge creation, in which one type of knowledge can be converted into another through four processes. In Figure 3-8 we have combined the knowledge spiral with indicators to show where in the organizational level these conversion processes occur. As companies proceed through the knowledge transfer, they pass through at least three, possibly all four of these processes. If a source organization needs to externalize knowledge, a receiver organization needs to internalize knowledge; perhaps doing so only after it has combined the external knowledge with its existing knowledge. As soon as the receiver organization employees are involved, a certain degree of socialization of the acquired explicit knowledge may occur. In addition,

[12] Note that this does not relate to the operate process, during which many clients expect to receive knowledge form the vendor. This only relates to the transition process in IT sourcing.
[13] While some authors differentiate between tacit and implicit knowledge, we regard both to be one and the same type of knowledge that is usually only acquired through experience.

certain cases may require direct interaction between the employees of the source and receiver organizations, resulting in direct socialization.

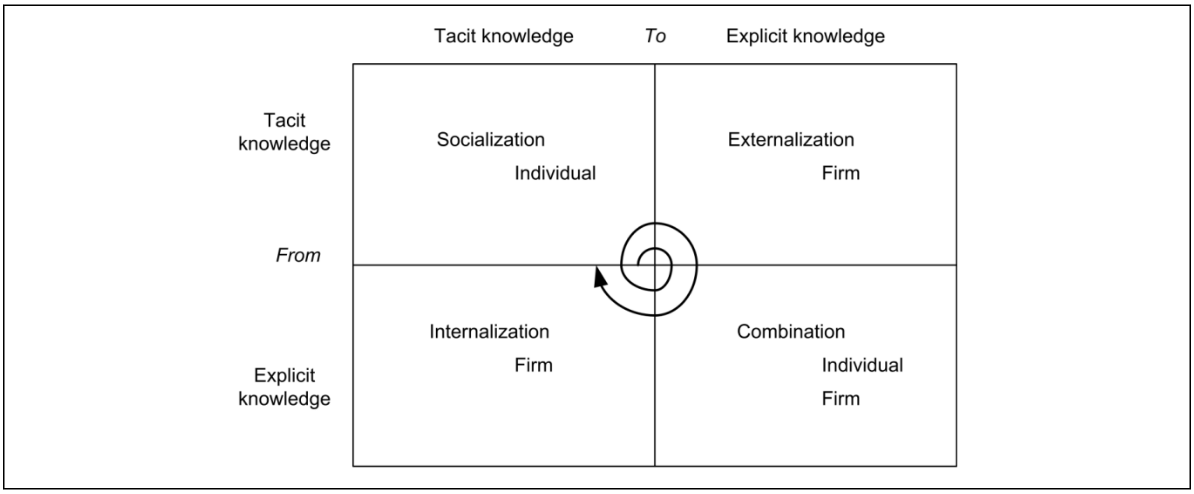

Figure 3-8: Knowledge transformation in the knowledge spiral adopted from Nonaka and Takeuchi (Nonaka and Takeuchi 1995)

Since our work aims to develop a knowledge transfer method for IT sourcing initiatives, aspects of all outlined knowledge conversions will have to be examined. We have outlined company behavior in significant detail in the earlier sections of this chapter. Despite our focus on the firm level knowledge transfer, individuals are important within some of the knowledge conversion processes (Allen 1977), and therefore are part of a knowledge transfer. We will finalize this section with a brief explanation of one people-centered theory related to our work, the theory of reasoned action. The theory of reasoned action will help to outline individual behavioral aspects that may influence the organizational level of knowledge transfer nonetheless.

Prior to executing a task in an organized environment, people start to formulate intentions based on their attitudes towards the respective action and its outcome. These intentions are good predictors for the action itself. Furthermore, the intentions and the attitudes are both influenced by the cultural context of the organizational climate and the personal characteristics of the individual. These relationships were discovered and first described by Ajzen and Fishbein as the theory of reasoned action (Ajzen and Fishbein 1980). Recently Bock et al. adapted the theory to knowledge transfer (Bock et al. 2005). Since the aim of our research is to develop a method that facilitates knowledge transfer on an organizational level, we decided to use the adaptation by Bock et al. (Bock et al. 2005). Specifically, we assumed a simplification of their model and reduced the research model to the authors' system of three building blocks, rather than considering the individual level factors. The authors proposed:

- that anticipated extrinsic rewards relate to the expected benefit in terms of financial compensation or status. This suggest that the motivation aspects with regard to knowledge transfer are to be considered, which is in line with the approach of Herzberg (Herzberg 1968).
- that anticipated reciprocal relationships relate to the desire of employees to maintain relationships with other employees and therefore be inclined to work together. This finding suggest that participatory work is beneficial for successful knowledge transfer, following in concept the earlier, more general, work of Vroom and Jago (Vroom and Jago 1988).
- that fairness, innovativeness, and affiliation represent social norms that the authors identified from interviews. In agreement with Granovetter (Granovetter 1985), this suggest that trust has some influence on knowledge transfer success.

In conclusion we establish the relationship of our research with the theory of reasoned action through the dimension of organizations abilities to manage individuals' aspects of knowledge transfer. After establishing these knowledge management foundations for knowledge transfer, we will revisit the factors that influence knowledge transfer in more detail in the next sections by looking at both intra- and inter-firm knowledge transfers.

3.2.2 Knowledge transfer within companies

Knowledge transfer within companies invariably involves individuals. To a certain degree, knowledge transfer therefore is affected by firm-specific activities and influence factors on knowledge transfer. This section will review the publications most relevant to our research. Therefore we will reflect on the literature on intra-firm knowledge transfers from the perspective of an organizational level; i.e., observing aspects that can be managed or are relevant when managing an IT sourcing initiative. The work of Szulanski (Szulanski 1996) observed characteristics of knowledge transfer, knowledge source, and knowledge recipient characteristics, as well as the context of the knowledge transfer. In that article, knowledge transfer success is defined as satisfactory performance by the knowledge receiver. This measure contrasts with measures based on perceptions of success or reductions of production costs; but it has the advantage that accounting for a successful transfer can occur much more transparently.

Szulanski (Szulanski 1996) identified three important factors that influence knowledge transfer success:

- The arduous relationship describes the friction between individuals involved in a transfer. This factor was identified to be very important by the authors. Therefore, if a knowledge transfer can be designed with less friction, the transfer is more likely to be successful. Friction and personal differences are less likely to emerge in a well-structured work environment. Therefore structural elements seem to be important to consider in our method. In addition, once the exchange between parties becomes less arduous, the motivation to carry out a given knowledge transfer may increase.
- The causal ambiguity reflects a lack of understanding of the exact definition of the transferred knowledge. This may happen if the knowledge is hard to specify or if the context in which it is to be applied is so new that a knowledge receiver cannot apply the acquired knowledge. As a result, exact and transparent specifications of knowledge are required for the knowledge source and receiver to work productively.
- The absorptive capacity defines the ability of a knowledge receiver to accept the new knowledge (Cohen and Levinthal 1990). We argue that absorptive capacity may influence the transfer as much as motivational factors, since a knowledge receiver that can easily assimilate new knowledge may be more motivated to do so than a knowledge receiver who has difficulties applying new knowledge.

The findings of Szulanski (Szulanski 1996), however, suffer several limitations with respect to our work. His work focused on the unit level and did not differentiate between individuals and units; i.e., no differentiation is made between individual entities and business unit entities. This may be why he scored the motivational dimension lower and focused instead on organizational aspects like absorptive capacity, arduous relationship, and causal ambiguity as robust factors.

Even though motivation has not been ranked particularly highly by Szulanski (Szulanski 1996), work by Burgess (Burgess 2005) shows that organizations need to provide not only motivation for knowledge transfer, but extrinsic rewards in particular. Furthermore that study shows that an organizational environment where sufficient time and resources exist for knowledge transfer is beneficial for such transfers. Interdivisional competition may also harm knowledge transfer with other units if it is not controlled properly. In addition, employees who can identify organizational benefits from knowledge transfer may participate more easily than those motivated by organizational upward mobility. In contrast, Bock et al. (Bock et al. 2005) report in their article that extrinsic rewards may actually reduce motivation for knowledge transfer. However, this result may well be influenced by the strong environmental focus of their research model or their cultural bias, as their results reflect exclusively South-Korean opinion. However, Wasko and Faraj (Wasko and Faraj 2005) have been able to replicate non-material motivation as an important factor influencing knowledge transfers. Their results show that individuals who expect that knowledge transfer will contribute to their professional recognition are more likely to participate in knowledge transfer activities, such as answering questions in an online community. In summary, researchers tend to agree that motivation is an important factor for knowledge transfer within firms, but to what extent extrinsic or intrinsic motivators contribute to overall motivation is unclear, since results vary between studies.

Trust remains a much researched factor influencing knowledge transfer, ever since Granovetter (Granovetter 1985) established it as an important factor in economic transactions. Recent articles have established that trust in the competence of the knowledge source and knowledge receiver is important for successful knowledge transfers (Levin and Cross 2004; Quigley et al. 2007). In addition, according to McKnight et al. (McKnight et al. 1998), the level of trust increases over time and it is specifically the non-benevolence component of trust that gains strength over time. While a consensus exists among authors that trust as an important factor, the interaction of trust and control is less clear. For example, Malhotra and Murnighan (Malhotra and Murnighan 2002) use an experiment to show that control has a crowding-out effect on trust. This finding contrasts sharply with observations of inter-firm knowledge transfers (Poppo and Zenger 2002).

In addition to trust and motivation, the degree of work done in groups has also been reported to be important (Grant 1996). Despite claims to the contrary (Wasko and Faraj 2005), increasing evidence suggests that participatory work significantly influences knowledge transfer (Bock et al. 2005). Furthermore, group work in knowledge transfer has not only been extensively researched (Stasser and Titus 2003; Stasser et al. 2000; Stewart and Stasser 1998), but the research has shown that smaller groups apparently exchange more information, particularly if the exchange process is structured (Stasser et al. 1989).

In light of these factors influencing knowledge transfer, a model for executing knowledge transfer can serve to assess the validity and relative importance of the different factors. In fact, Hamel (Hamel 1991) identified structural approaches to knowledge transfer. Szulanski (Szulanski 1999) presents these ideas in a more complete and empirically validated process model for knowledge transfer within the firm.

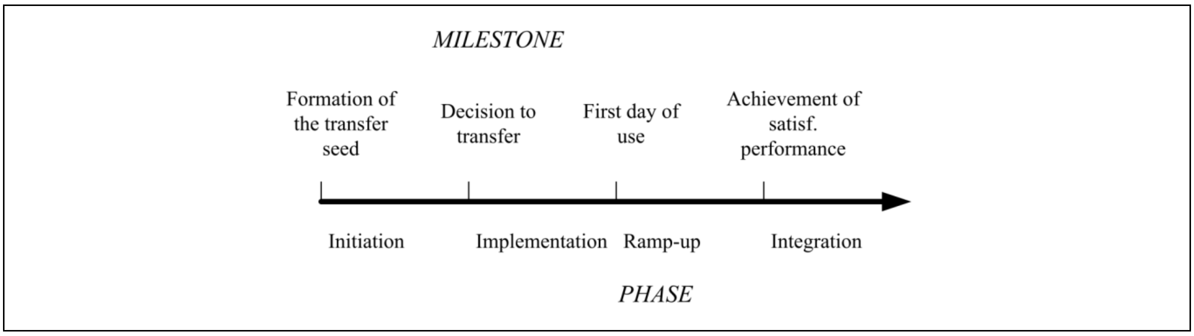

Figure 3-9: Knowledge transfer process according to Szulanski (Szulanski 1999)

The model developed by Szulanski (Szulanski 1999) is based on his earlier research (Szulanski 1996) on influence factors, and it stresses the importance of understanding knowledge transfer as a directed management process, rather than in the more simplistic terms of the sender/receiver framework adopted from communication science (Shannon and Weaver 1949). The process suggested by Szulanski (Szulanski 1999) entails four phases (Figure 3-9):

- The initiation phase involves analysis activities to identify existing knowledge and the gap in existing knowledge. Once relevant knowledge has been found, transfer opportunities are identified. For undocumented knowledge, Szulanski (Szulanski 1999) suggests documenting the relevant aspects. This recommendation is in line with other authors (Zander and Kogut 1995), including the findings from a pizza franchise case study (Argote 1999). Before entering the implementation phase, additional project attributes should be recorded, such as the rationale for the knowledge transfer, timing, knowledge transfer costs, and knowledge transfer obligations. Because of the complications in documenting and formalizing these aspects, the impact of causal ambiguity and transparency is primarily on the initiation phase.
- The implementation phase specifies when the knowledge source and knowledge receiver unit initiate communication directed at the knowledge transfer. In this phase Szulanski (Szulanski 1999) warns that both source and recipient are likely to not be able to perform their regular tasks, because they will be preoccupied with documentation and with creation of any special work products required for the knowledge transfer (e.g., equipment, software, or data). If this ”redirection” of efforts is not taken into account in the initiation phase, friction is likely to increase between the units because of conflicting goals and interests. Furthermore, following a pre-arranged plan is essential for avoiding intrusions into areas not agreed upon as “competence areas”, or avoiding failures to deliver the expected results. Therefore,

tight control and coordination during the process is required in order to ensure that neither over-performance nor under-performance impedes the knowledge transfer.

- The ramp-up phase starts when the knowledge recipient begins to apply the acquired knowledge. This period, while brief, is an opportunity to correct any problems arising from usage of the knowledge. Any problems that the knowledge receiver encounters and cannot solve will need to be passed to an external expert, most likely the knowledge source. During this period the knowledge receiver will still fall short of the targeted productivity but should gradually improve performance until reaching a satisfactory performance level. Performance progress therefore needs to be monitored in a similar manner as the progress of the implementation phase. In addition, Szulanski (Szulanski 1999) mentions several issues that may endanger knowledge transfer success, such as when knowledge receivers leave the company or turn out to be incapable of applying the knowledge (e.g., because of insufficiently trained, or poor skills). According to the author, these problems correspond primarily to causal ambiguity - therefore lack of transparency in the terms of our research - and they should be addressed during knowledge transfer planning.
- The integration phase starts once the knowledge receiver demonstrates acceptable work performance. The integration phase can manage improvement of the knowledge, further knowledge development, and distribution of the knowledge within the organization.

In conclusion, this section showed that knowledge transfer can best be described by a four-phase structured process. This process is influenced by various factors. Previous research has identified primarily motivation, trust, and participatory work. In addition, some authors found control elements to be beneficial to knowledge transfer success. Finally, the success measure of knowledge transfer is established by evaluating the work performance of the knowledge receiver. The following section will discuss knowledge transfer between companies. It will explore the similarities and differences from knowledge transfer within a company, and show how intra-firm research can be applied in an inter-firm context.

3.2.3 Knowledge transfer between companies

Knowledge transfer between companies requires more structure and control mechanisms, while participatory work requires more management. In contrast, trust is less important between companies than within companies. Between companies, contracts define the rules of engagement, while interactions within companies can also be managed by political and social norms. These observations are in line with transaction cost theory as outlined in section 3.1, and they reflect the state of current research in the area of knowledge transfer between firms.

While intra-firm knowledge transfers already require certain structure and control instruments (Szulanski 1999), these become more important in an inter-firm setting, since fulfillment of contract terms needs to be measured (Mathew et al. 2007; Murray 2001; Power et al. 2004). Specifically Argote (Argote 1999) noted that firms (franchises in this case study) that were operationally independent but owned by the same holding structure were more likely to share knowledge; in other words, structure facilitated knowledge transfer. More recently, Gellings (Gellings 2007) highlighted the essential importance of contract governance, a practice often neglected in IT sourcing initiatives (Power et al. 2004) – in contrast to contract design. Contract governance has already been recommended for knowledge transfer (Davenport et al. 1997; Larsson et al. 1998). However, even though control becomes more important, trust remains an influential factor (Poppo and Zenger 2002), because the governing contract will not usually be complete given the complexity of sourcing IT services (Koh et al. 2004). In particular, the initial trust in the knowledge source's ability (Ko et al. 2005) and the building up of trust in the long run[14] is of considerable importance for avoiding information asymmetries (Ring and Ven 1992). With reference to our organizational research perspective, we will focus on the build-up of trust rather than the initial trust, because initial trust is difficult to manage at an organizational level, at best. In addition to structure and control, many authors mention the benefits of working collaboratively in a participatory fashion (Alborz et al. 2005; Koh et al. 2004). However, participatory work requires more management attention when individuals from different firms are expected to work cooperatively (Rouse et al. 2001).

Given these similarities of knowledge transfer between firms and within firms, we argue that it is possible to adapt some of the insights from the research of internal knowledge transfer to an inter-organizational context. Of particular interest for our research is the knowledge transfer process of Szulanski (Szulanski 1999). Although not strictly designed for inter-firm knowledge transfers, the analysis of Szulanski (Szulanski 1999) is based on units within firms. Therefore, the move from inter-unit knowledge transfer to inter-firm knowledge transfer is less dramatic than from intra-person to intra-firm. It is reasonable to assume that at least

[14] In a stricter meaning of the word building up of trust could be considered confidence. While confidence is based on facts and build over time, trust is extended before any particular information is available. For the sake of our work, we will differentiate between the two by qualifying trust instead of using two distinct terms. For a throughout discussion refer to: Adams, B.D. 2005. Trust vs Confidence. Humansystems Inc., 24, Geiger, H. 2008. Vertrauen und Banken. University of Zurich, 14.

some units researched by Szulanski (Szulanski 1999) show relationships similar to those between firms interacting through a formal contract. For example units may be in diverse geographic locations and governed by a profit-center policy, just like firms in a contractual relationship.

To summarize this section, we showed that control and structure are more important in knowledge transfers between companies and other factors remain significant, though to a lesser degree. Furthermore, we argued that a knowledge transfer process developed for an intra-firm context could be applied for knowledge transfers between companies. The next section will briefly outline the activities and techniques such a knowledge transfer process may entail. Then, we will summarize the contribution of the knowledge transfer literature to the construction of a knowledge transfer method for IT sourcing initiatives.

3.2.4 Knowledge transfer activities and techniques

Knowledge management techniques can be found in many knowledge management practitioner sources (KnowledgeBoard 2007; NHS 2007). In addition, a rich set of techniques has been described through case studies (Dixon 2000; Kazi and Wolf 2006). Clearly the range of these different techniques is too broad to be covered. To reduce the diverse set of techniques to a reasonable set suitable for our research, we selected various techniques in cooperation with our sponsor firm. The governing selection criteria were demonstrated usefulness in world leading firms and distinguishable differences of the knowledge transfer techniques – independent of whether these were employed in IT sourcing situations or not[15]. This section will present only the techniques selected by our sponsor firm. The actual set implemented and the justifications for their selection will be presented in the findings of the pilot research. However, many more techniques were studied and are presented online, including a formal selection procedure for adequate knowledge transfer techniques (Bugajska 2007).

[15] Also refer to our earlier discussion of IT sourcing knowledge transfer techniques in section 3.1.5.

Technique	Short description	Known use	Source
Reflective practice	Detailed account about profession experience.	Arthur D. Little	(Schön 1987)
Alert notification system	Escalation procedure for reporting problems to engineers.	Texas Instruments	(Dixon 2000)
Power packs	Prepared set of documents related to one topic.	Ernst & Young	(Dixon 2000)
Knowledge assets	Prepared set of documents related to one topic.	British Petroleum (BP)	(Dixon 2000)
Buddy support	One of many support schemes where one employee advises another.	The Boston Consulting Group	(BCG 2007)
After action review	A solution-focused group meeting after a joint activity.	US Army	(Darling et al. 2005)
Learning histories	A historic account on how and when knowledge was acquired.	AutoCo, pseudonym US automotive firm	(Kleiner and Roth 1997)

Figure 3-10: Selection of knowledge transfer techniques

Seven techniques were considered, as illustrated in Figure 3-10. The techniques were all provided by practitioners and have proven their effectiveness in world-leading companies. We will briefly explain each of these techniques in more detail:

- The reflective practice is often also referred to as storytelling and is widely practiced in the agile software development community. As described by Schön (Schön 1987), an early practitioner of this technique, it entails an extensive conversational account regarding a task or experienced situation. Usually the account is detailed enough for any listening party to perform the actual task or mentally re-construct a given situation.
- The alert notification of Texas Instruments involves more of a series of techniques (Dixon 2000). The system is intended to hand problems from personnel interacting directly with clients, back to the product designers and engineers. Therefore techniques for problem capture and problem receiving are employed. These alert notification techniques help engineers to focus on customer-relevant issues rather than on those relevant to the engineers themselves. More recently, many such systems have been implemented first in the open source community (e.g., the Bugzilla error tracking system used by the Mozilla foundation (Mozilla 2007)) using simple problem reporting systems[16] accessible to the users, and subsequently by larger software vendors such as Microsoft in its Customer Experience Improvement Program (Microsoft 2007).

[16] Commonly referred to as bug tracking systems

- Power packs have been developed by the consultancy Ernst & Young to provide their employees with detailed guidance regarding several industry-relevant topics (Dixon 2000). The power packs contain training material, case descriptions, and even templates. The packs also suggest internal experts on the topic. All these documents are organized on topic levels cognitively easy to access by the Ernst & Young workforce, and they are full-text-searchable.
- Similar to power packs, knowledge assets are composed of relevant documents and are organized on a topic scheme (Dixon 2000). Knowledge assets differ from power packs because the former record knowledge that is infrequently used and targeted at subject matter experts; thus, knowledge assets usually do not contain training documents. Since the company that pioneered this concept, British Petroleum, is an engineering company, the knowledge assets contain more detailed engineering information, including step-by-step guidance on executing certain vital procedures.
- The buddy support technique described by the Boston Consulting Group (BCG 2007) is frequently used to introduce new hires into a work environment. The technique provides a new employee with access to another, more experienced employee. The experienced employee is meant to show the new hire practices and processes in the specified area of expertise. Usually this includes administrative procedures like staffing procedures, accounting, and access to research services. It may also involve limited training in technical subject matters such as market analysis.
- The after action review technique dates back to the 1970s and was developed by the US Army (Darling et al. 2005). The aim then and now is to provide a structured, open and relaxed environment in which to learn from the field experiences of team members. While the intention is problem mitigation, the meeting focus is solution-oriented. Participants in after action reviews are not looking for problems but solutions. Over the past decades the technique has been modified and extended to include various other activities apart from the meeting itself; today it may represent an activity or even a method in its own right.
- Finally, learning histories have proven invaluable not only to transfer knowledge, but also to discover knowledge. Developed by Kleiner and Roth (Kleiner and Roth 1997), the method suggests that participants take notes as they are exploring a given knowledge domain. As the participants progress they will be able to notice their prior, probably wrong, assumptions and deduce actions to address behaviors relating to the mistaken assumptions. In addition, the material collected in a learning history

is invaluable for preparing more structured learning content, such as trainings, power packs, or knowledge assets.

Using the aforementioned techniques most of the knowledge conversions mentioned by Nonaka and Takeuchi (Nonaka and Takeuchi 1995) can be executed. Two techniques allow knowledge elicitation, and therefore externalization, either when working closely together (after action review) or in more distant settings (learning histories). Two techniques (power packs, knowledge assets) are dedicated to structuring, documenting, and adapting existing knowledge, thereby combining and internalizing knowledge. Finally, the buddy support technique covers the strongly tacit dimension by allowing intense socialization between the designated parties involved in the on-the-job training.
In conclusion we argue that while these knowledge transfer techniques are only a few of the many that have been reported, they can facilitate all of the knowledge conversion processes described by Nonaka and Takeuchi (Nonaka and Takeuchi 1995) and cover both the individual and firm dimensions. Furthermore, and more importantly, their efficacy has been proven by practitioners and they are therefore more likely to be accepted as part of IT sourcing initiatives since the value has already been demonstrated. The following section will now summarize the knowledge transfer literature findings, after which we will present the assumptions and constraints of a knowledge transfer method for IT sourcing initiatives.

3.2.5 Knowledge transfer summary and identifiable method elements

The previous four sections following the IT sourcing sections detailed the breadth of knowledge management literature and the depth of knowledge transfer issues. We found the knowledge management model by Probst et al. to be rather well developed (Probst et al. 1999), but, as already noticed with existing models in the IT sourcing field, the model lacks critical method elements such as a role or information model. Furthermore, even the various activity models proposed several authors do not constitute a complete method (Nonaka and Takeuchi 1995; Probst et al. 1999; Szulanski 1999), as they usually lack technique descriptions and defined results. The notable exception remains the work of Szulanski (Szulanski 1999), which provides by far the most advanced knowledge transfer model, because some activity results are in fact specified. Therefore this work will provide the "standard" or benchmark activity model against which we will try to create our own method. In addition, we will synchronize our method with the broad knowledge management model described by Probst et al. (Probst et al. 1999),.

Regarding the principles and influence factors governing the various activity and procedure models, the research of knowledge transfer broadens the perspective from an economic transaction cost approach to include the theory of reasoned action. However, for knowledge transfers between firms, transaction cost-oriented factors like structure and control remain more important, whereas inter-firm knowledge transfer relies heavily on trust, participatory work, and motivation. In summary, in an IT sourcing setting, factors based both, on transaction costs and factors based on reasoned action need to be considered, but the emphasis should be on the former.

Method element	Knowledge transfer literature findings
Principles*	Structure: (Szulanski 1996), (Szulanski 1999), (Stasser et al. 1989), (Hamel 1991), (Argote 1999) Transparency: (Szulanski 1996) Control: (Davenport et al. 1997), (Larsson et al. 1998) Participatory work: (Grant 1996), (Bock et al. 2005), (Stasser and Titus 2003; Stasser et al. 2000; Stewart and Stasser 1998), (Alborz et al. 2005; Koh et al. 2004) Motivation: (Cohen and Levinthal 1990), (Burgess 2005), (Bock et al. 2005), (Wasko and Faraj 2005), Trust (general): (Szulanski 1996), (Granovetter 1985), (Poppo and Zenger 2002) Trust (initial, in competencies): (Levin and Cross 2004; Quigley et al. 2007), (Ko et al. 2005) Trust (build over time): (Ring and Ven 1992)
Procedure model	Provide synchronization with the knowledge management model of Probst et al. (Probst et al. 1999); Consider the strategic aspects of knowledge; Consider the roles proposed by Davenport and Prusak (Davenport and Prusak 1997); Design to firm level but regard the individual as important knowledge transfer agent (Nonaka and Takeuchi 1995)
Role model	(Stasser et al. 1989): Small groups do better at knowledge transfer; (Davenport and Prusak 1997): Knowledge project managers, senior knowledge executives, integrators, librarians, synthesizer, reporters, editors. (Argote et al. 2003): Coach
Information model+	Various authors mention documentation, particularly Zander and Kogut (Zander and Kogut 1995), (Argote 1999): codification of knowledge
Activities	(Szulanski 1999): Initiation, implementation, ramp-up, integration; (Probst et al. 1999): Knowledge goals, knowledge identification, knowledge acquisition, knowledge development, knowledge distribution, knowledge utilization, knowledge retention, knowledge evaluation; (Nonaka and Takeuchi 1995): Socialization, externalization, combination, internalization
Techniques	(BCG 2007): Buddy support; (Dixon 2000): Power packs, knowledge assets, alert notification system; (Darling et al. 2005): After action review; (Schön 1987): Reflective practice; (Kleiner and Roth 1997): learning histories
Results	(Szulanski 1999): Rational for knowledge transfer, process maps, flowcharts, Also: scope, timing, costs and obligations of knowledge transfer (Ounijan & Carne 1987)
Tools	(Wasko and Faraj 2005): Online forum; (Dixon 2000): database, intranet

+ None of these documents was described in detail, only mentioned. Some references included recommendations on what to include in the documents.
* No direct references provided because the factors emerge from the argument in the text. Refer to the text for details.

Figure 3-11: Summary of knowledge transfer method assumptions and constraints gathered from the literature on knowledge management and knowledge transfer

The table above (Figure 3-11) summarizes the constituent method elements we were able to observe in our literature review. The summary shows that the knowledge transfer assumptions and constraints are more specific than the IT sourcing requirements. Several roles are identified and the activity descriptions are far more detailed. In addition, some results have been proposed for at least some stages of the knowledge transfer process. However, as in our review of the IT sourcing literature, we found the recommended tools to be rather generic, and not aligned to the various activities. The following section will now conclude the search for assumptions and constraints within the literature by combining the findings from the literature on IT sourcing and knowledge transfer, thereby providing a consistent overview of the state of the art.

3.3 Summary of research gaps

With respect to our research questions and our approach to describe constituent method elements we find a series of gaps in the existing body of IT sourcing knowledge transfer literature. The preceding literature covered knowledge transfer literature both between and within the firm. We also observed more general economic principles of the firm and reviewed the IT sourcing literature with respect to general models and specific aspects of knowledge transfer in IT sourcing initiatives.

Regarding our first research question on the principles affecting activities of knowledge transfer in IT sourcing initiatives we found a large set of suggestions. However, while many general, and some intra-firm, principles have been suggested, few collection of knowledge transfer principles has been proposed for IT sourcing knowledge transfer. Therefore, the collected principles merit further investigation. It remains unknown whether the proposed set of principle is a good choice and helps to design an effective knowledge transfer within IT sourcing initiatives.

Our second research question focused on the individual activities with regard to effective knowledge transfer. While many sources indeed offer guidance with regard to which activities are suitable for knowledge transfer, and some sources even propose some knowledge transfer guidance for IT sourcing initiatives a conclusive interaction between a defined knowledge transfer process and a defined IT sourcing process does not exist. In consequence we need to conduct a more detailed analysis of knowledge transfer activities in the context of IT sourcing initiatives.

Finally, since our method driven research approach and our third research question address several additional elements to build a coherent method we need to consider these additional method elements in our research. While knowledge transfer activities have been mentioned in general, neither the associated roles, results nor the documents are discussed by earlier research in sufficient detail. In particular, the synchronization of knowledge transfer method components and other related methods in the IT sourcing field remains undefined. In order to develop a coherent knowledge transfer method for IT sourcing initiatives we need to investigate how all of the required method elements fit together.

Before we start to present our empirical research the following section will briefly summarize the assumptions and constraints we draw based on our literature review. These assumptions will be revisited at the end of our case study and pilot research.

3.4 Summary of assumption and constraints based on literature research

Since we find a rich set of activities and influence factors within the knowledge transfer literature, we are in the fortunate position to select the most appropriate results for the outsourcing context. The list in Figure 3-12 on the next page presents our assumptions and constraint collection for knowledge transfer in IT sourcing initiatives. The collection of assumptions is organized in one section for each constituent method element. The relevant literature findings on which these assumptions and constraints are based are presented throughout this section. The detailed assumptions and constraints from each field are illustrated in Figure 3-5 and Figure 3-11. These assumptions and constraints will be condensed and adapted as we discover new aspects of knowledge transfer in our case study research and the piloting research to yield a final set of requirements.

The most obvious feature of our assumptions and constraint collection is the close alignment of the procedure model with the work of Szulanski (Szulanski 1999). In fact, we chose to model our method around the activities suggested in this work. Therefore, our research contributes to the body of knowledge transfer research by also evaluating the findings of Szulanski (Szulanski 1999) in an inter-firm context. In this way, our research extends his work to make it a complete method. The IT sourcing field will benefit by applying the method to better manage the transition process. The following chapter will present findings from the two data sets we have been collecting. We will discuss the results, highlighting which of the aspects were already covered by our literature based assumptions and constraints, and which were not included. The final section in the next chapter will consolidate all findings and provide a consistent set of requirements that should be implemented by any knowledge transfer method in IT sourcing initiatives.

1. Pre condition
    1.1. Success is measured by work performance metrics
    1.2. The method considers identifiable knowledge items
    1.3. The method considers only dyadic transfer of one task responsibility from one employee to one other employee
    1.4. The method facilitates one-time transfers in contrast to continuous knowledge transfers
    1.5. The method interfaces with, rather than describes, an organizational knowledge management infrastructure
        1.5.1. As a result, a knowledge management role is available to assist with knowledge management policy
        1.5.2. As a result, a knowledge management information system is available for knowledge storage and retrieval
        1.5.3. As a result, a human resource liaison role is available for career and incentive design
    1.6. The method interfaces with, rather than describes, an established IT sourcing management infrastructure
        1.6.1. As a result, a relationship manager role is available to address stakeholders
        1.6.2. As a result, a contracting manager is available to negotiate, implement, and monitor contract clauses
        1.6.3. As a result, clearly defined schedules can be established
        1.6.4. As a result, clearly defined resources can be assigned
        1.6.5. As a result, penalties and performance incentives can be established
        1.6.6. As a result, a business case for IT sourcing exists
        1.6.7. As a result, a rationale for knowledge transfer has been designed
        1.6.8. As a result, a communication plan exists and can integrate knowledge transfer information
2. Principles
    2.1. Trust in the skills of the knowledge receiver and knowledge source, excluding benevolence
    2.2. Motivation, including career and financial incentives as well as penalties to motivate the firm and the individual
    2.3. Participatory work: working together to achieve defined knowledge transfer goals by including the individual
    2.4. Transparency: clear communication and knowledge identification during the knowledge transfer initiative
    2.5. Structure: methodological, process-oriented knowledge transfer with defined results and activities and roles
    2.6. Control: controlling knowledge transfer progress and quality in response to incentives and penalties
3. Procedure model
    3.1. Synchronize knowledge transfer by the knowledge receiver organization with that organization's knowledge acquisition activity
    3.2. Synchronize the knowledge transfer from the knowledge source organization with that organization's knowledge distribution activity
    3.3. Start the knowledge transfer in the IT sourcing architecture phase
    3.4. Synchronize knowledge transfer before finishing the architecture phase
    3.5. Synchronize the knowledge transfer when beginning the transition process
    3.6. Proceed though the knowledge transfer in the following order: Initiation, implementation, ramp-up, integration
    3.7. Synchronize the knowledge transfer when finishing the transition process
    3.8. Hand over knowledge transfer to the knowledge management organization after finalizing the transition process
4. Role model
    4.1. Create a knowledge source role
    4.2. Create a knowledge receiver role
    4.3. Create a committee role including business group head, director, board member of client and provider
    4.4. Create a program manager role
    4.5. Create knowledge management liaison role at the knowledge receiver organization who manages knowledge executives, integrators, librarians, synthesizers, reporters, and editors
5. Information model
    5.1. Create a skill profile of the knowledge receiver
    5.2. Create a skill profile of the knowledge source
    5.3. Create an organizational chart of the future organization
    5.4. Document the knowledge sharing policy
    5.5. List the knowledge sharing stakeholders
    5.6. Create a plan for developing the capabilities of employees
    5.7. Create an employee competency inventory
    5.8. Create documentation of relevant knowledge
    5.9. Sign a cooperation agreement with stakeholders
6. Activities
    6.1. Initiation, including knowledge goal setting (by benchmarking existing knowledge against that of competitors), knowledge identification (by identifying strategic business functions or product components) and knowledge planning, skills identification of retained employees, communication of knowledge sharing policy, establishment of incentives for knowledge sharing, provision of resources for knowledge sharing
    6.2. Implementation, including externalization through documentation and verification of documentation effort
    6.3. Ramp-up, combination, and integration through knowledge application, verification that work taken over is performed effectively
    6.4. Integration, socialization, and further internalization of knowledge through knowledge development and knowledge distribution
7. Techniques
    7.1. Consider face-to-face techniques such as meetings, seminars, work-shadowing, buddy support, and after action review
    7.2. Consider staff transfers
    7.3. Consider questioning techniques such as question answering, reflective practice, and an alert notification system
    7.4. Consider documentation techniques such as power packs, learning histories, and knowledge assets
8. Results
    8.1. Provide documentation by means of process maps and flow charts
    8.2. Provide a project plan detailing knowledge transfer costs, as well as schedules and obligations of knowledge transfer
9. Tools
    9.1. Consider databases to store knowledge
    9.2. Consider an intranet to access knowledge
    9.3. Consider an online forum to ask questions publicly

Figure 3-12: Consolidated assumptions and constraints

4 Research design

To provide a transparent and credible account of method construction, the employed research methods and detailed execution need to be described. The current chapter describes our research methods and how the research work was carried out. We will describe a comparative multi-case study research method and a piloting research method. This chapter will begin with a general introduction of the case study research method and will continue by describing in detail each step in the research design. Our case study design follows the steps suggested by Eisenhardt (Eisenhardt 1989). The second part of the chapter discusses our piloting approach in terms of action research steps, as outlined by Baskerville (Baskerville 1999), and describes our organizational interventions.

However, this chapter falls short of the final steps described by the aforementioned literature. Specifically, the hypothesis shaping step (part of the case study research) and the evaluation step (part of the piloting research) are not presented. Revisited literature for the case study and piloting research is finally presented in a related research section attached to each sub section of chapter 6. This division has been chosen both in order to restrict the current chapter to only method related aspects as well as to provide the relevant empirical observations with as little methodological clutter as possible.

4.1 Case study

Case study research in general is composed of an eight step process (Eisenhardt 1989). Each step (Figure 4-1) concludes with several results, and, in our research, some steps were repeated as we conducted multi-case comparative research (Yin 2003, p. 49). Also, compare Mayring (Mayring 2002) and Lee (Lee 1989) on how multi-case studies improve the replication evidence. In the following sections we will present each step separately and outline our adaptations where appropriate in order to make our research design as transparent as possible. In the course of our research design presentation we will outline how each of the problems of case study research, as outlined by Lee (Lee 1989), are addressed by our work.

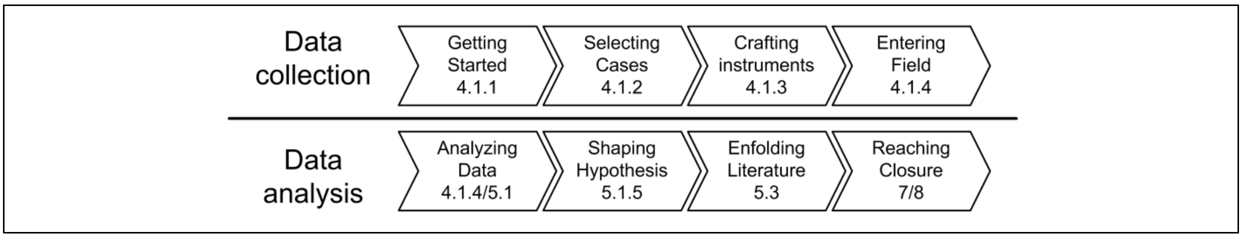

Figure 4-1: The eight steps towards theory from case study research referencing relevant document sections, based on Eisenhardt (Eisenhardt 1989)

4.1.1 Getting started

Our preparation began in April 2005 with formulating the general research interest as outlined in 1.2. We chose to study knowledge transfer in IT sourcing initiatives. Particularly, we focused on finding a method for solving this particular problem. Both to understand the field and to derive an initial set of constructs, we engaged in semi-structured interviews between August 2005 and November 2005 with thirty participants at one company that sponsored our research as well as at one of their suppliers (Figure 4-2). We did not conduct a review of any prior outsourcing or knowledge transfer literature. At the beginning of the interviews, the researcher in question was naïve on the subjects. This theoretical clean slate approach, as suggested by Eisenhardt (Eisenhardt 1989), allowed us to focus only on the emergent patterns for the moment, to be matched and enriched by the literature afterwards.

These interviews helped us to understand the problems and the overall processes in the IT sourcing relationship. Furthermore, we witnessed important factors influencing the relationship. Both processes and influence factors could then be used to derive a set of constructs to be used in preparing our case study instruments, specifically the initial coding schema and interview questions. In addition to this, the interviews revealed a set of selection criteria helpful for providing useful evidence in solving the problem of knowledge transfer in IT sourcing initiatives.

	Employees	**Management**
Sponsor firm	9	7 (incl. CIO)
Supplier	4	4 (incl. CEO)
Other contractors	2	0
Invalid interviews	4	0
Total	19	11

Figure 4-2: Interview partner summary for case study preparation

The limitation of our first step clearly includes researcher bias, as the interviews were transcribed (we omitted any effort to code the answers) and a strong sampling bias. Case study logic, however, draws upon replication logic rather than upon sampling logic. Therefore, the repetitive finding of similarities is more important than is the sample's representative nature. Additionally, the researcher bias may as well have applied if a literature review would have been conducted prior to the interviews – the researcher might have selected only familiar, not necessarily significant sources for the development of the construct.

4.1.2 Selecting cases

To address the first problem of case studies – making controlled observations - outlined by Lee (Lee 1989), we defined a set of requirements prior to selecting our cases for observation. The Swiss economy shows a large number of small and medium enterprise (SME) firms (BFS 2005); therefore we chose case selection criteria matching SMEs. SMEs are usually conducting IT sourcing deals below 10 Mio. CHF total contract value (TCV)[17]; therefore, deals smaller than 10 Mio CHF were considered (alternatively less than 100 full time equivalents – FTE). Since the Swiss economy and especially the greater Zurich area is heavily based on the financial services industry, this industry became a focus for our research. Additionally, we are aiming at IT related sourcing deals, as this is the area of our expertise, and the research question focuses on this particular business function. Given the timing of our research, and the focus of our research interest on knowledge transfer, we aimed to include companies with prior IT sourcing expertise. Hoping that more experienced companies have already established a specialized process for knowledge transfer, we selected IT sourcing deals signed after 2000. Many of these deals are likely to be second or even third generation contracts with the required experience of answering questions related to our research. Finally, we aimed to find cases where we could obtain client and vendor interviews; if possible, we asked for executive, management and employee interviews. In taking into account all parties to an IT sourcing contract, we hope to be less prone to one-sided views regarding the research interest.

The following table summarizes our case data set and compares it with the selection criteria. Whenever the outlined criterion is met, we will indicate this in the criterion column next to the criteria with a tick symbol. While we have conducted an additional set of seven case studies, we chose not to report them as part of this study, because they did not follow the case study protocol (see section 4.1.3). Consequently, these cases are not included in the following table, and their findings are not considered for this research.

[17] As informed by the CEO of a local IT sourcing advisory firm through personal communication.

Case ID	Deal size	Criterion	Industry	Criterion	Experience	Criterion	Business function	Criterion	Notes
UD.1[18]	Small	✔	Financial services	✔	No		IT	✔	
UD.2	Small	✔	Financial services	✔	Yes	✔	IT	✔	
UD.3	Small	✔	Financial services	✔	Yes	✔	IT	✔	Failed
UD.4	Large		Financial services	✔	Yes	✔	IT	✔	
SK.1[19]	Medium	✔	Financial services	✔	Yes	✔	IT	✔	
SK.2	Medium	✔	Financial services	✔	Yes	✔	IT	✔	Re-sourcing
SK.3	Large		Financial services	✔	No		IT & BPO	✔	Failed
CN.1[20]	Medium	✔	Financial services	✔	Yes	✔	IT	✔	Equity
CN.2	Large		Financial services	✔	Yes	✔	IT	✔	Equity
CN.3	Large		Financial services	✔	Yes	✔	IT	✔	Equity/failed
CA.1[21]	Large		Electric utilities		Yes	✔	IT	✔	
CA.2	Large		Telecommunication		Yes	✔	IT	✔	Only vendor
CA.3	Small	✔	Textile industry		No		IT & BPO	✔	Only vendor

+small: below 1Mio. CHF/10 FTE; medium: 1-10Mio. CHF/10-100 FTE; large: above 10Mio. CHF/100 FTE

Figure 4-3: Overview of the data set of selected cases

As illustrated in Figure 4-3, most of our cases conform to all of our selection criteria. Four cases are short one criterion, and three fall short of two selection criteria. Small and large deals are balanced within the financial service industry and many of the large deals represent rather well executed IT sourcing arrangements that are particularly informative in terms of our research. The three cases CA.1-CA.3 were included in the study to observe if there are any differences between different industries. The same reason explains why these cases have been included, despite two having only been granted vendor interviews. Of particular comparative interest should be the deals SK.2, SK.3 and CN.3. These cases showed partial backsourcing of services to the IT sourcing client and in the latter two cases, the IT sourcing failed (though, after conclusion of our study). Finally, the deals CN.1 to CN.3 all featured some kind of equity holding between client and service provider. All except the CA.2 case were domestic sourcing contracts with only a single vendor, UD.4 and SK.2, being the exception to running a multi-vendor contract. Furthermore, we were able to collect data from various clients with the same IT sourcing vendor. The cases CA.1, CA.2, CA.3 and partially UD.4 were all collecting data from one IT sourcing vendor. Similarly, the cases CN.1, CN.2, and CN.3 were with a single (but different than the one mentioned before) IT sourcing vendor. A third vendor was involved in the cases UD.1, UD.2 and UD.3. Finally, the cases SK.1, SK.2, SK.3 and some of UD.4 were each related

[18] Originally prepared and published by Dahinden, U. 2007. Validation of a Knowledge Transfer Reference Model for Outsourcing Business Contexts, Universität Zürich, Zürich.

[19] Originally prepared and published by Keller, S. 2006. Wissensmanagement und Wissenstransfer im Outsourcing-Prozess, Universität Zürich, Zürich.

[20] Originally prepared and published by Novara, C. 2006. Wissensmanagement in Outsourcingbeziehungen und Wissenskulturfortschrittskontrolle, Universität Zürich, Zürich.

[21] Originally prepared and published by Aegerter, C. 2006. Wissenstransfer beim Outsourcing – Eine empirische Untersuchung von IT und Business Process Outsourcing-Projekten, Universität Zürich, Zürich.

to different vendors. In total, our data covers seven different vendors and thirteen different client firms.

Even though the sampling is not technically required by case study research (Eisenhardt 1989; Yin 2003, p. 49), we deliberately tried to get a sample of cases containing failures and successes. Some of the IT sourcing providers, however, denied us access to these cases. This in turn may lead to pattern replication applicable to already successful IT sourcing cases. Nevertheless, some of our cases did include a re-sourcing or partial backsourcing initiative, then with the new IT sourcing provider.

4.1.3 Crafting instruments

The development of a case study's instruments is the core of any case study research design. Our instruments follow the proposed rigor of Yin (Yin 2003, p. 106) in defining a chain of evidence. This technique ensures that the data for making controlled deductions is provided (Lee 1989). In particular:

- we employed a questionnaire with interview instructions,
- we employed a coded transcript file,
- we employed a coding table and
- we employed an evidentiary database.

The questionnaire was the same for all interviewees, and the final[22] version contained a total of 50 questions, many with several sub questions (Appendix A). In addition to the questionnaire, we developed instructions on how to conduct the interview in general; these were:

- "Ask written permission for taking the interview from the individual."
- "Explain the purpose of the interview and that all data remains anonymous and confidential."
- "Explain that the interview will be recorded and transcribed."
- "Send a transcript to the interview participant for validation and clarification."

The instructions were noted in writing prior to every case study. Additionally, we prepared a set of 158 codes (Appendix B) from our initial preparation interviews, from the literature and from adaptation called for by the data itself. These codes were then attached to case descriptions (by the author and in four cases by a master student and checked by the author) that were made by

[22] The final version, used only in the cases UD.1-UD.4, contained fifteen additional questions to the otherwise unchanged questionnaire. These questions are clearly marked in the sample provided.

citations and linked to individual case answers in order to ensure adequate usage and understanding of the meaning of the codes. All of the interview transcripts were then coded in Microsoft Word comments on specific sections of text. These prepared transcripts allowed us always to link codes to citations and citations to codes[23]. Finally, codes were counted and linked to case identifiers in a Microsoft Excel file (Appendix C). This final document represented our evidentiary data base and allowed us to attach citations and compare code frequencies among cases. Figure 4-4 shows each of the aforementioned documents in the chain of evidence and aligns our instruments to each relevant construct. The top most construct in our research, the study report, has been prepared by the same students who conducted the interviews.

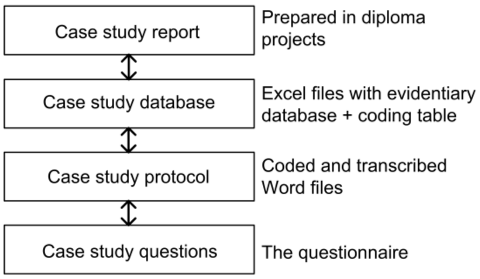

Figure 4-4: Chain of evidence based on Yin (Yin 2003, p. 106) linked to our case study instruments

In order to triangulate the most important findings of our data in the evidentiary database, we developed a survey as part of this case study research. While surveys are not commonly used as data source for case studies, Yin (Yin 2003, p. 91) establishes their usefulness, provided that they are prepared according to the standard surveying procedures and incorporated into the case study only as additional and not as rivaling data source. Even more, Eisenhardt (Eisenhardt 1989) suggests aggregating case findings with quantitative data in order to discover relevant facts hidden within the case study or to bolster existing qualitative findings when the quantitative evidence supports them. In order to collect the survey data, we conducted a more general purpose IT sourcing survey in which several questions regarding key concepts from our evidentiary database were included. The detailed survey design is provided in the appendix (Appendix D). Such an additional source of information will enrich the validity argument, as the following paragraph explains.

Apart from providing an integrated, transparent path from our conclusions to the observed data, our instruments are conforming to established validity criteria. Four validity criteria are of concern in case study research, namely construct validity, internal validity, external validity and

[23] These documents were not included in the appendix in order to provide confidentiality and identity protection for participating individuals.

reliability (Yin 2003, p. 34). Except for the internal validity test, each test needs to be addressed by the case study instruments or by the research design:

- Construct validity establishes that the concepts being studied are correctly operationalized. The constructs under observation are constituent method elements (see 2.1) facilitating successful knowledge transfer in an IT sourcing initative. These elements themselves have been found valid by prior research. Furthermore our interview questionnaire includes a procedure for asking interview participants explicitly to remember one particular knowledge transfer, and then to describe this knowledge transfer. These answers result in highly accurate accounts on how the interview participant experienced the knowledge transfer. Single informant accounts, however, may be biased. Our case selection criteria therefore asked for cases where we could ask more than one involved employee at each firm. To further strengthen the research findings, the survey will provide additional data on the construct validity as the constructs can be tested with a larger population. This, and our established chain of evidence and the practice to send transcripts to interview participants for review, is in line with the recommendation by Yin (Yin 2003).
- External validity grants our results generalizability within the domain being observed and thereby addressing Lee's (Lee 1989) generalizability problem. Our instruments are firmly placed as multiple-case studies within a defined population of IT sourcing firms primarily in the financial services industry. How much of our findings can be applied in other industries or sourcing types may be shown by the cross-case analysis. Replicating our results, as suggested by (Lee 1989), is our solution to his third problem, and finding emerging patters when asking the same questions is comparable to the external validity derived from experiments. The replication logic of case studies is therefore, similar to experiments, dependent on the amount of external factors the research is able to control. Some cases in our sample were not able to control for all of the external factors outlined by our case selection criteria. To cover the technical gap of imperfectly similar cases and multitude of organizational influence factors, a survey is employed to validate the core evidentiary database findings. Our instrument design and case selection criteria in general, however, establish a firm baseline in controlling the surrounding organizational environment when compared to other case studies in the IT sourcing field like Lacity and Willcocks (Lacity and Willcocks 1998). While executed expertly in many aspects, validity is not addressed in their article. Because of the lack of references to standard case study

validity criteria the research design employed by them is in many aspects more similar to survey research than case study research.

- The reliability of our instruments was established by the aforementioned documentation of the chain of evidence and their various elements. The reliability of each individual case study interview was established by sending each interview transcript to the interview participant for review. Additionally, most interview participants were managers or executives of the firms being studied. As these individuals usually oversaw the IT sourcing case, they were able to provide an accurate account of all aspects of a given case, therefore further increasing the account's reliability. Finally, reliability was improved by asking IT sourcing client and vendor representatives. Such a practice likely prompted interview participants to give a more accurate account of the situation, because inaccuracies are more likely to be detected than in a single informant setup. This allowed us to discover discrepancies in the perception of a given IT sourcing case.

In conclusion, we are confident to have had valid and reliable instruments that are transparently documented according to specifications from case study literature.

4.1.4 Entering field

The field work has been conducted by analysts equipped with the instruments outlined in the previous section. We choose different individuals for the data collection than for the design, and later the analysis, to limit researchers' bias through overly engaging in one particular case – A practice recommended by (Eisenhardt 1989) especially for cross-case comparisons. In total five master level students were tasked with the data collection of each up to four individual case studies. Four master students conducted their case studies in the period from August 2005 to April 2006, however, the entire data set of one student was not transcribed properly and the data in one case of another student was only available in Italian language and was therefore discarded. One additional master student collected further case study data in the period from December 2006 to June 2007. To ensure consistency among the analysts they were instructed jointly and were given written task descriptions. All instructions regarding the instruments usage were summarized in Microsoft PowerPoint files to allow reproducibility (Appendix E). Finally from April 2007 to October 2007 one master student conducted a survey.

The first group of students tasked with case study data collection conducted a series of pilot interviews (partly based on questions developed as part of an earlier case study from May 2005 to November 2005) as suggested by Yin (Yin 2003, p. 79) and the final instruments were jointly modified based on the pilot interviews outcome. Data on the pilot interviews will not be presented as part of this research.

4.1.5 Analyzing data

The data analysis will be done based on the evidentiary database selecting one IT sourcing case as the unit of analysis. Besides bar chart comparisons of feature counts in the whole set of case studies (Miles and Huberman 1994, p. 253), we will be drawing on case comparisons. The particular technique has been outlined by Miles and Huberman (Miles and Huberman 1994, p. 183) as content-analytical summary. These pattern-matching techniques are found to be sufficient by Yin (Yin 2003, p. 117) to establish internal validity. In addition to this technique we will be using a number of sub sets of cases based on the anomalies outlined in the case selection, and try to explore rival explanations to further enhance the internal validity of our constructs. These comparisons between different in one dimension but otherwise similar cases may show if any particular dimension has influence on the knowledge transfer. By following these structured analysis techniques we are addressing the problem of controlled deductions outlined by (Lee 1989). Our controlling and guiding variable will be knowledge transfer success in function of work performance achieved - or credible evidence that such could be achieved with a named practice - (Szulanski 1996), supported by IT sourcing success in function of cost saving or quality improvement (Rouse et al. 2001), as reported in the case and all the methodological constructs related to this variable.

4.1.6 Hypothesizing, literature and closure

An initial set of assumptions and constraints is framed from literature in section 3.4. And will be developed further in combination with the case study data in section 5.1. The complete analysis in section 5.3 will incorporate the literature reviews in chapter 3 and the findings of the case studies as well as from the pilot research.

4.2 Piloting

No standard piloting process has been defined by Schwabe and Krcmar (Schwabe and Krcmar 2000) or any earlier work. Nevertheless, Schwabe and Krcmar (Schwabe and Krcmar 2000) show that piloting inherits methodological elements from prototyping and action research. Action research provides a standard five step procedure: readying client-system infrastructure, diagnosing, action planning, action taking, evaluating and specifying learning (Baskerville 1999). The influence of prototyping on piloting requires these steps to be repeated until the research method's results are achieved (Schwabe and Krcmar 2000). Piloting research is an interpretative research approach where the researcher engages in repeated learning cycles. With respect to our research interest the objects we are learning about during the various learning cycles are: a method, influence factors of a method or constituent elements of a method. These learning cycles are summarized in the piloting cycles described by Baskerville (Baskerville 1999). Figure 4-5 shows the general piloting cycle and references the relevant chapters and sections in this thesis referring to each learning cycle phase.

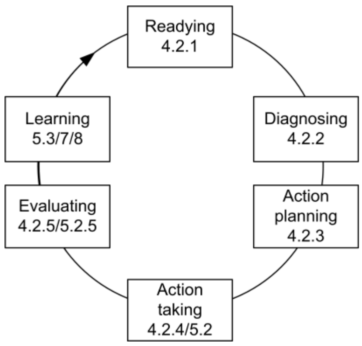

Figure 4-5: Six steps of the piloting research method and references to relevant document sections based on action research process (Baskerville 1999)

The piloting with our sponsor was conducted in two phases. During the first phase we conducted a total of four pilots; the second phase included a total of two pilots. These six pilots took a total of eighteen months to complete. Additionally, one specific activity of our method was tested in an additional pilot that was not planned as part of the piloting process. While the first phase's learning step was relatively short, the second learning step took several months as we worked through various iterations of our method with practitioners from the sponsor firm. A more detailed account of how the actual piloting process was carried out is provided in chapter 5 in section 5.2.

4.2.1 Readying

At the beginning of our work we followed suggestions by Baskerville (Baskerville 1999) and established a contractual agreement with the sponsor organization governing the research goal, the specific teams to be available for the research, the deliverables expected from the research team as well as the responsibilities for certain deliverables. The agreement specified a required position with the sponsor's organization concerning research collaboration as recommended by Baskerville (Baskerville 1999). Specifically, a 50% FTE position was to be provided by one employee so that the employee could be more closely engaged with the research team and provide specific insight regarding any uncovered anomalies in the situation. This role was referred to as method engineer. The contractual agreement was complemented by a steering committee which met every six to eight weeks and included the research team, one sponsor firm manager, two sponsor firm executives as well as one supplier firm executive. Each single pilot intervention was presented to the steering committee in order to gain consent. A second periodic meeting was planned with supervisors and managers of the sponsor firm, but was later abandoned both because the feedback was not constructive and because the additional reporting burden slowed the progress of the research. During the course of the research four problems in the setup had to be corrected. We were faced with the following:

- An involved client sponsor executives who launched the project as part of a strategic initiative. Broad management approval and feedback, however, were not obtained, resulting in confusion among managers. This issue was addressed by presenting the project to, and collecting feedback from, the management board of the sponsor firm. At that point, a key leader of the sponsor organization took the initiative to support the project more closely, resulting in a much improved awareness and response to our work.
- The sole executive interest of the project which resulted in poor communication to staff members of the sponsor organization. While all staff members were briefed at the beginning of the project, with the increased management support we were able to address all employees a second time. This second time, employees were directly addressed by the sponsor firm's managers.
- The fact that no written agreement regarding the research initiative was obtained from the supplier organization. This resulted in detailed and time consuming management of supplier employees and tactical interventions by the supplier asking the sponsor firm to be excluded from direct research. We partly solved the issue by asking a supplier executive to reemphasize the importance of the research and by intervening through sponsor firm agents. The indirect intervention, however, depended heavily on the agents' acceptance and capabilities of managing the supplier. Consequently, not all interventions were performed adequately. Since no formal consent agreement was ever reached with the supplier organization, the situation only improved once we received more management support. The supporting manager had the required credibility with the supplier organization to ask for favors and to demand certain tasks to be performed.
- A method engineer in the beginning of the project who was incapable of providing independent analysis of anomalies in the sponsor organization. While we received feedback on our work, certain aspects were skewed to the opinions of the method

engineers. The problem was rooted in picking a method engineer from one of the teams being researched and the resulting lack of distance from the problems encountered. The issue was corrected later by changing the method engineer to an employee more distant from the relevant teams.

In conclusion, a well defined agreement and proper management in addition to executive support and communication had to be acquired prior to effectively starting the piloting interventions.

4.2.2 Diagnosing

The diagnosis of the sponsoring company problems, as suggested by Baskerville (Baskerville 1999), was conducted as part of our knowledge transfer method. The first diagnostic step of our knowledge transfer method asks for relevant knowledge to be identified. Our initial approach in the first piloting phase consisted of employee interviews and extraction of key concepts asked from other individuals. These concepts were collected and a supervisor was asked to assign them to employee roles as well as to identify to what extend the role required the knowledge and how much was still missing. Our revisited processes during the second piloting phase no longer involved interviews, but asked the relevant concepts for a team directly from a supervisor, respectively from his or her employees. Each concept was to be rated by the supervisor in terms of its operational importance and linked to one of several business functions. Additionally, an executive outlined strategic goals and their strategic importance and then linked these to business functions. These business functions were the same ones used by the supervisor. This process eventually generated a list of knowledge to be transferred. Most of these steps had to be assisted by researches or the method engineer, since they were not known to the employees involved.

4.2.3 Action planning

As with the diagnosis step, we performed a knowledge transfer planning step as part of our method. The planning involved a variety of steps including selecting suitable knowledge transfer subjects. The first pilot phase used a rather complex planning process with numerous preparation meetings (two larger ones and about twelve one-on-on meetings) and employee profiles of knowledge source and receiver to be filled out by a total of four different people. Each profile editor had a different degree of access to the profile, due to the sensitivity of the data. This planning process, while effective, was too complex for the sponsoring organization. The planning process was considerably simplified in the second phase based on our learning from the previous pilots. The most important change was the substitution of the planning meetings with a single document that recorded the relevant facts. Additionally, the profiling of employees regarding their knowledge transfer abilities was abandoned and certain risk related factors were now recorded by a single person. We employed supervisors and employees during the planning in both pilot phases of the knowledge transfer as suggested by Baskerville (Baskerville 1999). In addition to the method engineer, a project manager from the sponsor firm supported our planning steps.

4.2.4 Action taking

Once the planned knowledge transfer activities were approved by the steering committee, we executed the plan according to the knowledge transfer method specifications regarding activities, principles, procedures and document requirements. The table in section 5.2 summarizes the tested activities, tools, documents and roles for each pilot as well as identifying at what point the sponsor firm's agents took control of the activities.
All of the knowledge identification was carried out by the research team. While sponsor firm employees were involved, the results were research driven. The same holds true for the knowledge transfer planning. Except for the last pilot, the planning was heavily driven by the researches. Admittedly it was not until before the very beginning of the second phase that actionable method documentation was available. Therefore, for many of the earlier pilots we had to resort to general purpose material such as Microsoft PowerPoint slides or written details in e-mails in order to communicate instructions to the involved employees. Despite detailed oral instructions on turning over initiatives to the sponsoring firm agents, the pilots often failed to execute or only partially executed the instructions. Moreover, the designated project manager of the first pilot of the second phase did not want to read the method documentation, which again required researcher participation in this pilot. In contrast to the phase one pilots however, all phase two pilots were managed actively by the sponsor firm's supervisors or project managers. Such a change greatly improved the adequate implementation of the chosen activities.

4.2.5 Evaluating and learning

We evaluated our piloting work by observing how well certain interventions worked and what the individual participants reported regarding our interventions. Moreover, after most of the pilots, we were able to conduct exit interviews. Except for pilot one, three in the first phase and pilot two during the second phase no notes for such exit interviews were taken. Since pilot one of the first phase and pilot two of the second phase were both only performed partially and were run by agents, we concluded that any evaluation would likely have captured more political facts than useful data for improving the knowledge transfer method. Pilot three during the first phase, however, never got beyond the planning phase of the knowledge transfer because the designated knowledge receiver left the sponsor firm.

All of these observations and notes were coded with the constituent method element words as well as with codes from the coding schema developed during the case study analysis. The usage of just one single coding schema greatly improved the analysis comparability among the piloting findings and case study findings. As a result, we were able to merge our learning into one requirements summary (see section 5.3). The findings from the first phase were therefore summarized and the method was adapted accordingly for the second phase.

This concludes the piloting and case study research design and intervention description. The actual empirical observations of both research efforts are presented in chapter 5.

5 Empirical observations

The current chapter will present the results from to our data collection using the case study and piloting research methodology outlined in chapter 4. At the end of the chapter we will produce a comprehensive requirement list with items to consider when engineering a method for knowledge transfer in IT sourcing settings. These requirements are the peak of what we like to refer to as the "requirements pyramid". The peak of the pyramid rests on two main pillars: the case study data and the piloting research data. These two pillars presented in this chapter depend, in turn, on the foundation formed by the assumptions and constraints gathered from previous research in the fields of IT sourcing and knowledge management presented in previously in chapter 3.

The first section will present the results of the case study research and summarize the findings by contrasting them with the literature-based assumptions and constraints. This comparison between the empirical and theoretical findings will bolster existing claims, reject others, and introduce new ones. In the second section we will present the findings from the piloting research and, as before, contrast the findings with the literature based assumptions and constrains. Finally, we will summarize all the findings in the last section of this chapter, where we will present the final list of claims in a list of requirement items for an IT sourcing knowledge transfer method.

The results presented in this thesis have been chosen to replace one generalizeable set of assumptions (literature based assumptions and constraints presented in chapter 3) with a more complete generalizeable set of requirements (final requirements in the last section of this chapter). However, to maintain generalizability, it is inevitable that we must abstract from the data collected in the field. Our selection criterion has been to present only those observations that could be observed in two or more cases or pilots. Where the observation must either have contributed to a successful knowledge transfer or we collected evidence that a practice would have avoided a knowledge transfer failure. Such a result discrimination leads to a rather thin requirements set regarding the final techniques method elements, since the more detailed the evidence was, the less it replicated in cases or pilots - Especially with respect to the pilot research which yielded highly detailed knowledge transfer observations. The reason is that some, often valuable, observations could not be confirmed by two independent field observations or sources and therefore did not qualify for inclusion in any generalizable set of requirements. Nevertheless, since chapter 6 will present the practitioner-approved knowledge transfer method in its entirety, even these single event observations (i.e., non-generalizable observations) will be presented, but not in terms of a generalizable requirements claim.

5.1 Case study findings

This section presents our results gathered from 13 IT sourcing case studies primarily within the financial services industry. We were able to conduct a total of 30 interviews with a total of six vendors: three of the top five worldwide vendors plus three national vendors. In all but two cases, we were able to obtain vendor and client opinions. Our interviews included 14 client and 16 vendor informants, 28 of whom were managers and two were non-managers. Vendor informants for the UD cases were the same for each case. Similarly, the vendor informants for the CN cases were the same in each IT sourcing initiative under investigation. All clients studied in the financial services industry represent firms within the small- and medium-sized enterprise segment. Most clients run regional operations and offer international services to some of their customers. Two of the cases in the non-financial services industry are large global enterprises, while the small, non-financial services firm also classifies as a small- to medium-sized enterprise. The cumulated estimated total contract value is 611 Mio. CHF with an average of 47 Mio. CHF per case, which falls to 15.3 Mio CHF if the biggest case is excluded[24]. One of the cases we studied was reported by the client to have failed, and two additional cases failed after we concluded our study. For more details regarding the individual case profiles, including details on the number and type of informants, please consult Appendix F. In conclusion, we were able to collect a sample of IT sourcing cases matching our case selection criteria - the case selection criteria are discussed in detail in section 4.1.2.

5.1.1 Case descriptions

In our analysis we distinguish between successful IT sourcing cases and successful knowledge transfer cases. Seven of the cases studied showed successful knowledge transfers in terms of satisfying work performance of the knowledge receiver. The presentation that follows in this section will illustrate the case selection criteria as they relate to the various elements that constitute the method. In addition, we contrast successful knowledge transfer cases and unsuccessful cases, and we compare these cases against other IT sourcing dimensions where appropriate. The table in Figure 5-1 lists characteristics of the IT sourcing design in the cases of successful knowledge transfer.

[24] Contract value was available for only nine cases and the average total contract value of these deals was used to estimate the value of the remaining four. For international vendors only the estimated Swiss revenue has been included in the estimate.

	UD.1	UD.4	SK.1	SK.2	CN.2	CA.1	CA.2
Experience	No	Yes	Yes	Yes	Yes	Yes	Yes
Deal Size	Small	Large	Medium	Medium	Large	Large	Large
Duration	Medium	Medium	Medium	Long	Long	Long	Medium
Location	Onshore	Onshore	Onshore	Onshore	Onshore	Onshore	Offshore
Dependence	External	External	External	External	Captive	External	External
Scope	Selective	Total	Total	Selective	Selective	Total	na
Suppliers	Single	Single	Single	Multi	Single	Single	Single
Source	Outsourcing	Outsourcing	Outsourcing	Outsourcing	Outsourcing	Outsourcing	Outsourcing
Strategic	Value & Transitional	Value & Transitional	Value	Value	Value	Value & Transitional	Value
Depth	Application & BPO	Infrastructure &Application	Application	Application	Application	Infrastructure	Infrastructure
Industry	Financial services	Financial services	Financial services	Financial services	Financial services	Electric utilities	Telecom

Figure 5-1: Characteristics of IT sourcing design in cases with successful knowledge transfers[25]

Throughout this section we focus on the most salient data. To develop an understanding of the patterns emerging from our dataset, we used frequency counts (Miles and Huberman 1994). Each emergent code was then analyzed and individual quotations were taken to show the relevance and dominant opinion of the source. The resulting collection of codes was used to illustrate aspects of IT sourcing in general and of successful knowledge transfer in particular, always with a focus on the core elements of a method.

For the detailed data tables, including the evidentiary database, coding schema, and code profiles used in this section, please refer to Appendix A to Appendix G. Most codes and their respective categories were taken from literature sources – compare our literature review in the previous section. Some codes and categories have been added during the coding and re-coding process and these codes are described in footnotes through this analysis. The literature source of each code is marked in the coding schema (Appendix G) – if no source is indicated the code was derived during the analysis. The presentation will use translated quotations and display translated codes and other data. The original data was in German; some resources in the appendix have not been translated to English to maintain the original expression of the informant or because a translation would not contribute to the scientific argument.

The following sections will compare the over-all findings for each element of the method. We will examine the results as a function of deal size, equity aspects, and client experience level. This presentation will focus entirely on cross-case comparisons. We will start with the principles of the method and proceed through the procedure, information, and role model to finish with a comparison of activities, techniques, and tools. We will refer to each case using the case identification symbol in Figure 5-1. In addition we will append the case identification symbol with either a ".P" to indicate a provider informant or append a ".C" to indicate a client

[25] Note that we define knowledge transfer success in function of either direct informant declaration or work performance achieved.

informant. The section will conclude with an analysis of relevant findings with regard to the assumptions and constraints developed during our literature review.

5.1.2 Results regarding method principles

The 13 cases featured several codes, some of which represented more influential factors than others. The concepts emerging from all the codes related to method principles aligned with the six key concepts identified during the literature analysis (compare section 3.1.5 and section 3.2.5): trust, control, structure, transparency, motivation, and participatory work. In all cases, communication, either between individuals or between client and vendor in the form of an escalation procedure, emerged as an important factor. At the same time, all of the participants mentioned the importance of measuring and controlling the IT sourcing relationship even while seeking to create a trusting partnership. In 11 cases, we noticed demand for transparent communication of the IT sourcing and knowledge transfer initiative. Furthermore, 10 of 13 cases regarded participatory work or structure as an important factor. Finally, motivation ranked last, with only nine of the cases showing some motivational features. To construct the method, we will translate these factors into the principles of the knowledge transfer method. For example, a manager convinced that IT sourcing has a strong change management component and therefore requires leadership and ultimately employee trust in the firms' leaders, may employ more direct communication techniques. In contrast, a cost-focused manager afraid of losing valuable employees too early in the IT sourcing project may choose a less transparent IT sourcing planning process, and therefore employee skill profiling may not involve the employees directly. While our coding and aggregation represent these different opinions as abstract data points on a case based level, the analysis makes recommendations for real action, in the form of advice on how to construct the knowledge transfer method. For example, the strong demand for control may prompt us to include a role to control the knowledge transfer within the 'role model' element of the method. Figure 5-2 illustrates the ranking of the method factors on a case level[26] calculated by taking the most frequent code assigned to each factor as an estimator. Another possible approach would be to sum all cases where any of the sub-codes of a given factor were applied. The latter technique, however, results in strong bias in favor of the given factor and may give results deviating strongly from the respondent's intended meaning. Therefore this technique has not been chosen. The following chart illustrates the relevant code distribution over all 13 cases. The ranking does not change significantly if only the seven cases with successful knowledge transfers are considered. The only change would be that structure would share a

[26] Note from our research method description that the unit of analysis is each individual IT sourcing case.

second place, of three possible ranks, with transparency if successful knowledge transfers were to be excluded.

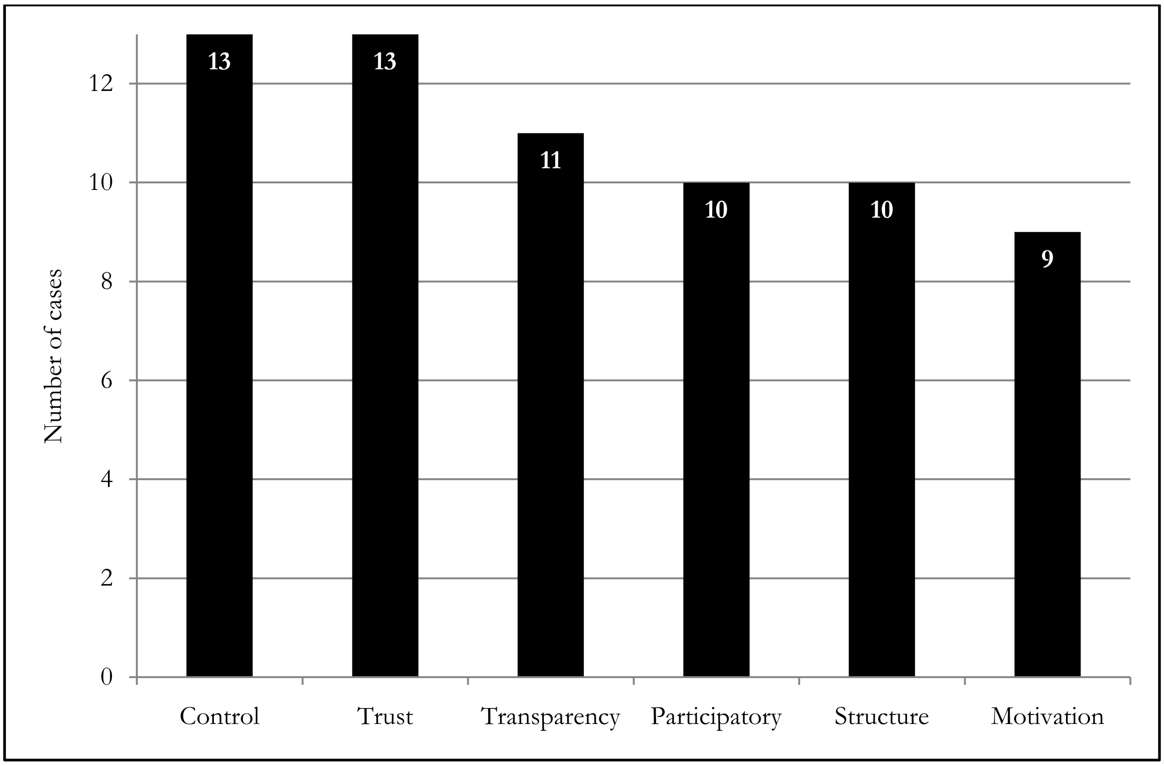

Figure 5-2: Factors reported to influence the knowledge transfer process, as identified in cross-case comparison of all 13 cases (n=13)

The control factor in particular may often reflect the management of an IT sourcing contract. All cases highlighted control and measurement issues, and most respondents told us that control should be exercised rigorously. However, some respondents, especially those involved in small deals, felt that the project was too small to involve either project or knowledge transfer control. For example one executive (UD.2.C) mentioned: "To perform typical project controlling in this deal would be too much effort" and another client executive (SK.2.C) told us: "No, we don't think very highly about measurement tools… we escalate any issue when knowledge transfer is not working as intended… we just can't afford a complicated management tool." In contrast, another respondent (UD.3.C), when asked to what extent control influenced the client's project success, stated: "That's an area (author note: control) where we did too little and therefore problems emerged." In fact, the deal was reported by the client to have failed. In two of the cases mentioned, the clients had prior IT sourcing experience and the vendor (UD.2.P) strongly endorsed strict project and quality control: "Continuous controlling is the most important aspect of a project. We are performing a high level of controlling. At our firm several processes are in place to ensure the documentation of progress and status." While the smaller deals primarily mentioned IT sourcing control in general, only the large non-equity deals provided control for knowledge transfer in particular. However, the control process was strongly driven by the organization receiving the IT services function (i.e., the vendor); as one vendor (CA.1.P) told us, "The goal definitions mentioned that knowledge transfer should be conducted." Control is consistently seen to be less important - with the exception of product quality control - in deals where either client or vendor holds equity in the other party, or where a third party interacts with both. As one respondent (CN.3.P) stated: "This (author note: knowledge transfer) is something only independent organizations are engaging in. You probably have the wrong employees if you need such practices. If an (author note: software quality) error occurs, we will record the error. Why and whether such an event relates to knowledge transfer can be determined rather quickly." This knowledge transfer failed.

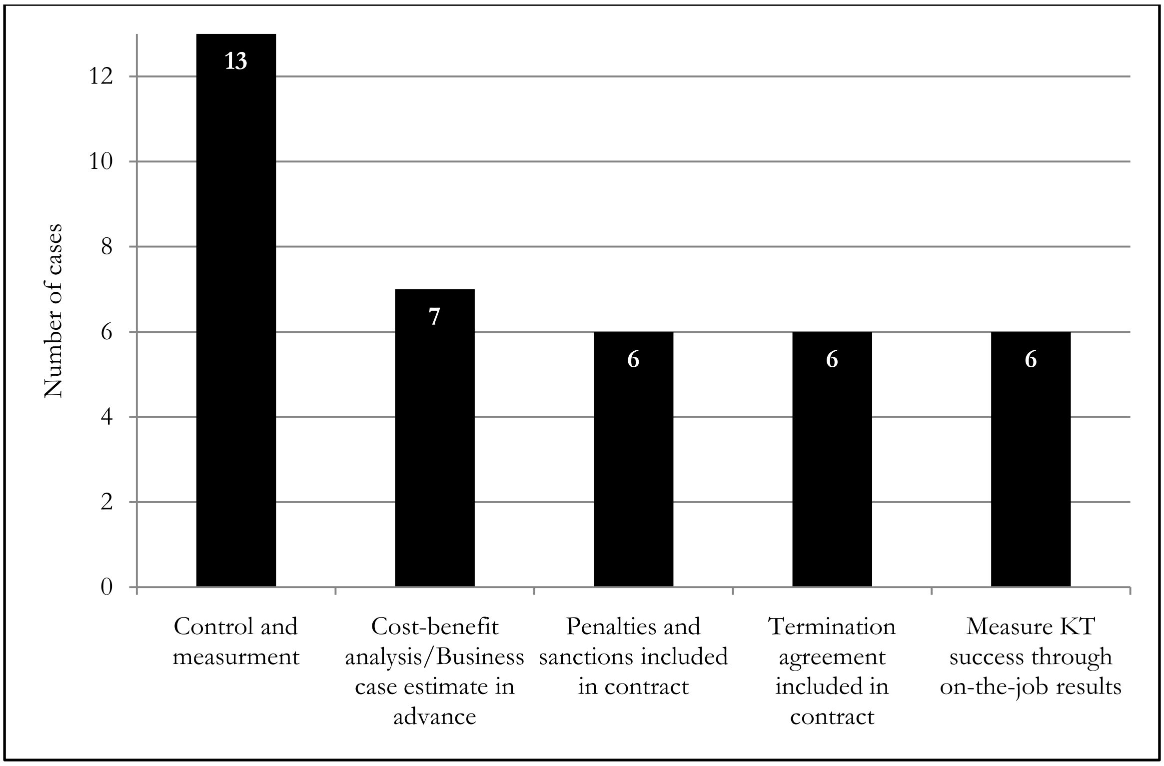

Figure 5-3: Controlling aspects of IT sourcing knowledge transfer (n=13)

Fewer than half of the contracts studied included penalties, sanctions, or termination agreements (Figure 5-3). Only seven of 13 cases conducted cost-benefit analyses prior to signing the outsourcing contract. One independent contract advisor told us that he knew of many large clients having difficulties managing their contracts, which is an additional indicator that clients do not effectively control their IT sourcing vendor. A client executive (CN.3.C) of a large deal reached a similar conclusion: "You can outsource the IT function, but you should never lose control." One provider executive (CA.2.P) for a large contract expressed his views regarding control and knowledge transfer as follows: "Knowledge transfer is a very difficult thing and you need to be very focused on the management side." Yet only six of the 13 cases – five of them large or medium deals with experienced clients – attached penalties and sanctions for contractual noncompliance to the IT sourcing contract. As one client manager (SK.2.C) pointed out: "No documentation, no delivery acceptance… no money." Two of these six deals evaluated knowledge transfer success by measuring the knowledge transfer through job performance metrics. All but one of the deals that included penalties proved to be successful IT sourcing initiatives, with successful knowledge transfer. Four of the cases mentioned also included a formal termination clause in the IT sourcing contract. Because so many cases within our category of medium-sized deals implemented direct or indirect control practices, we conclude that controlling a knowledge transfer initiative in an IT sourcing transition process is likely to improve the outcome. However, the aspects being controlled depend on the type of project. Some projects control for quality and project progress, while others control only for one of these. In addition, specific knowledge transfer control may not be suitable for smaller IT sourcing contracts.

Trust, the second top-ranking factor, is indicated by three uncertainty reducing codes: "create trust"[27], "give responsibility"[28], and "acceptance"[29]. The first two are observed in all cases. The following figure shows the relative ranking of the codes as found in interview transcripts.

[27] The code "create trust" was used when ever trust was being built up either through communication, or other means (e.g., formal or informal assurances, mutual understanding, references, cooperative work environment, availability, and acceptance).

[28] The code "give responsibility" was used to mark text that relates to the hand-over of responsibility either from a client to a vendor or from one employee to another. This code identifies how (i.e., in which way) accountability was transferred, either temporarily or permanent, shared or divided.

[29] The code "acceptance" was used to code text that referred to improving acceptance of peoples input and skills, or realization that skills are well developed and suitable for a job. This code also refers to situations where errors were taken a given and it was realized that sometimes things would have to be just corrected.

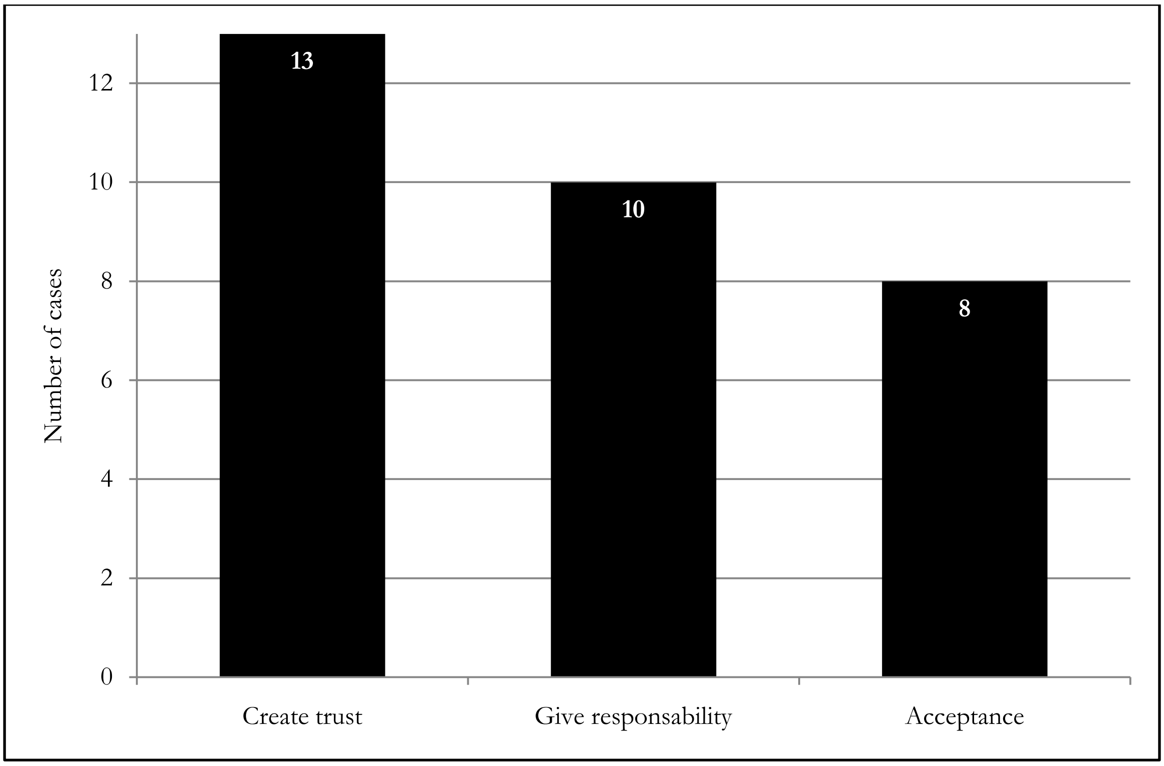

Figure 5-4: Aspects of trust in IT sourcing knowledge transfer (n=13)

In contrast to the “control and measure” code, the codes “create trust“ and “give responsibility” are clearer in indicating that a trusting environment and showing trust by handing over responsibility are common elements that improve knowledge transfer success. All but one successful knowledge transfer in this study eventually gave responsibility to the party receiving the IT service function, most likely showing that eventually sufficient trust hast been build up. In a representative quotation, one vendor manager (CN.1.P) on a medium contract whose knowledge transfer failed stated: “This (author note: joint meeting) was difficult in terms of operation, because we were unable to assign responsibilities to agreements being made. If you just say, the committee is in charge, all of the responsibility evaporates.” Additionally, a vendor manager (CA.1.P) at a firm based in Switzerland with international operations noted that in their large contract, it was important that the vendor and client employees accepted one another: “In Switzerland (author note: client is based in Switzerland with international operations) we have established a trusting relationship. The former employees of the client are also still well received by their former firm. An important underlying second aspect is the joint „history“, especially the mutual professional acceptance.” The client (CA.1.C) on this contract supported this assessment: “…through continuous contact with the same contact person. Trust is the key to outsourcing success! The project executive and I are still on the project. One cannot define everything in a contract.” The importance of trust is observed even in small deals, where it is achieved, to quote one respondent (UD.3.C), “especially through personal relationships. Daily routines set in.

Access to the same people facilitates the building of trust. It is hard to develop trust if the other party is constantly changing." Some vendors (SK.2.P) informed us that they build trust actively through shared experiences where no prior work "history" existed: "Social events were organized. Periodic newsletters, parties with up to 400 people, etc." However, while personal relationships and trust were found to be important in deals of all sizes, personal relationships appeared to be much more people-specific in small deals (UD.1.C): "That's the point that is most difficult to control. In the end, it's in the contract. But personally, I'd have to say, I trust Mr. Vendorio (author note: name changed) if he promises anything. On the other hand, I appreciate having only one or two contact people." In summary, trust emerges as an important factor. The trust is built over time and it relates to professional skills rather than to benevolence. It seems that trust is related much more to specific individuals in smaller deals than in larger ones.

The second ranking factor, transparency, is composed of the codes "create transparency"[30], "create ambiguity"[31], communicate "future organization"[32], and communicate "future tasks of knowledge source"[33] (Figure 5-5).

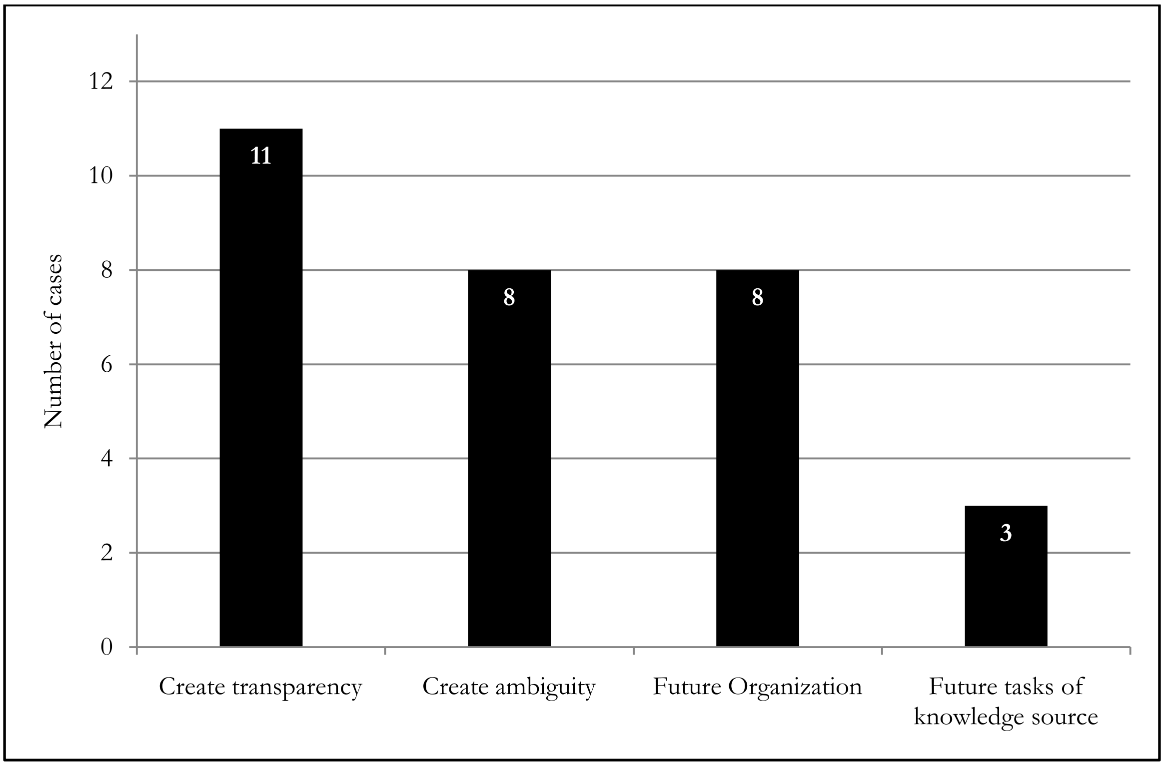

Figure 5-5: Aspects of transparency in IT sourcing knowledge transfer (n=13)

[30] The code "create transparency" was used to mark text relating to communication of current and future actions. In contrast, to the "communication" code, which would include any form of communication, the "create transparency" was used to identify such aspects that enhanced the understanding of how and why the organization is being managed.

[31] The code "create ambiguity" was used to mark text where uncertainty was actively created by hiding information from employees.

[32] The code "future organization" relates specifically to text referencing the description or communication of the future organization.

[33] The code "future tasks of knowledge source" relates specifically to text referencing the description or communication of future tasks for the knowledge source.

The codes frequency in favor of transparency (i.e., "create transparency", communicate "future organization", communicate future tasks of knowledge source") suggest that a high level of transparency in the observed cases, except the "create ambiguity" code. Six of seven successful knowledge transfers were found to create transparency, while only three also claimed to create ambiguity, and one case did not mention either. The rationale for ambiguity was stated by a vendor (CN.3.P) as the desire to simplify the project management: "Before (author note: more transparent project status reporting), this (author note: disruption) did not happen, because they didn't know what was going on…we continued with the software development and nobody disturbed us. …, but as a customer, I would also like to know this (author note: project status)... But making a mountain out of a molehill is entirely beside the point." The client (CN.3.C), on the other hand, was apparently dissatisfied with the level of transparency provided: "Currently, we are short on evaluation reports and similar documents. We need to ask the provider for each document. These documents include joint status reports regarding the implementation. Meaning, we always want to know whether everything is going ok or if there are any problems. If there are any, we want to know where and why." This large equity-sharing deal later failed and showed no successful knowledge transfer. In addition, some clients decided to arrange the whole IT sourcing in secrecy (SK.3.P): "The project setup was prepared by a small team. Four to five managers of each firm met in a secret place. That's why we couldn't consult certain experts." In the end this deals knowledge transfer and the IT sourcing failed. Apart from these ambiguities related to project management, we did not find any other deliberate reductions in transparency. In fact, we observed a strong desire in medium and large deals to define the future organization rather transparently. One vendor manager (CA.2.P) told us: "We inform the customer's retain-team constantly about changes." Another manager from the same vendor (CA.1.P), but on a different deal mentioned: "We've got a rigid delivery organization and I need to include the transferred employees (author note: from the client) in this organization." A client manager (UD.4.C) working with the same vendor noticed the same careful organizational planning: "Employees who worked in a specific role (author note: that remained with the client); i.e., IT security lead or contract managers, remained within our firm." Even a client manager (SK.1.C) with a different vendor agreed with this approach, noticing "that the management took time with the employees, that the employees were integrated… and that the vendor and client worked side-by-side in the same organizational unit." In addition, one vendor manager (SK.1.P) emphasized the need for "clearly defined governance models…in which open and transparent information exchanges are taking place on good and bad issues to the same extent." Furthermore, some organizations even discovered that providing the knowledge source with a well-defined career perspective is important for the knowledge transfer (SK.2.P): "If it's not possible to provide (author note: career) perspectives then, maybe, some things (author note: part of the outsourcing agreement) need to be reversed." These organizations found that the risk of not communicating an IT sourcing agreement properly can lead employees to actively hinder the process. As one transferred employee in a large deal explained: "One does not know what the future will provide. That's why one tries to hinder the outsourcing at first, because one is afraid." Knowledge transfer, in particular, may suffer from inadequate career perspectives of the knowledge source, which is why some cases used detailed skill profiling to establish the essential workforce prior to the point where any of them could hinder the IT outsourcing effort. In one case (CA.1.P), a transferred employee reported: "First the client identifies which employees are key personnel to him in a list." A client manager (SK.2.C) told us that "these people need perspectives for themselves and the future in general." Therefore, not only is the future organization an important aspect in knowledge transfers, but so is the future role of the knowledge source in the organization. In summary, transparency seems to be more important in medium and large deals. The observed anomaly of "create ambiguity" is due to project specifics. It is particularly important that the future organization and the future role of the knowledge source be transparently communicated. Establishing clear governance principles benefits the IT sourcing in general and the knowledge transfer in particular.

Participatory work and structure tie for third place in the ranking of factors that influence knowledge transfers. Participatory work is divided into the codes "togetherness"[34], "divided responsibility"[35], "participatory planning"[36], and "shared responsibility"[37] (Figure 5-6).

[34] The code "togetherness" refers to text related to cooperative work and jointly executed tasks and a partnership like manner where both parties are equally committed. This code is in contrast to anything done by a single person motivated to achieve personal goals.
[35] The code "divided responsibility" relates to text mentioning that one single entity is accountable for a given task.
[36] The code "participatory planning" relates to text on cooperative planning in a partnership like manner.
[37] The code "shared responsibility" relates to text on more than one entity being held accountable for a given task.

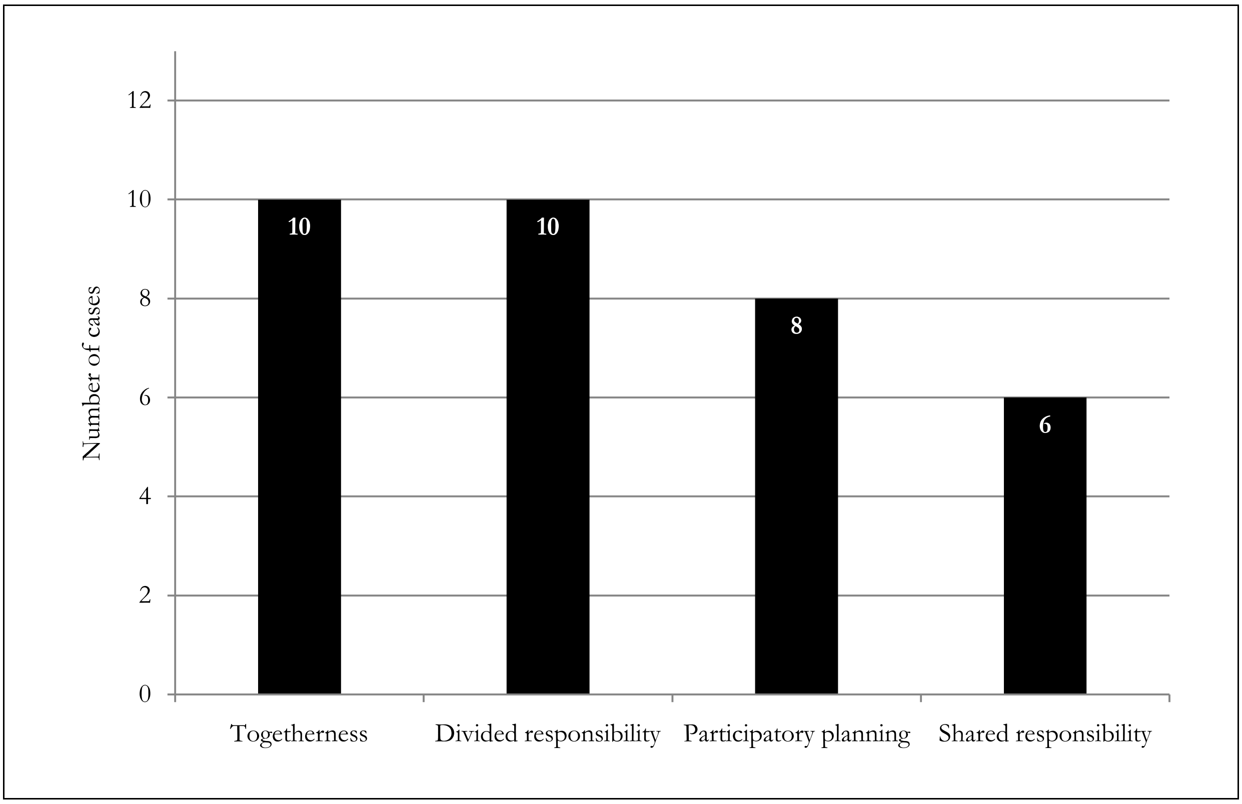

Figure 5-6: Aspects of participatory work in IT sourcing knowledge transfer (n=13)

The aspect of participatory work showed mixed result: the second and last codes directly conflict, for example. Interestingly, five of the seven successful knowledge transfer cases reported some sort of divided responsibility between vendor and client; only two of these cases also reported shared responsibility. Moreover, of the successful knowledge transfer cases, only financial services firms were coded with responsibility codes. Cases from other industries did not show codes for either divided or shared responsibility. Whether their knowledge transfer was successful or not, most cases showing the togetherness code were large deals (five) or medium deals (two). Three small deals showed the togetherness code. Nevertheless, a joint approach to the relationship is present throughout all 13 cases studied. The comments of a client manager (UD.4.C) are representative of the many cases showing the togetherness code: "In the end, we all know that the project success can only be achieved together." Planning aspects, in particular, seem to dominate the joint work. As another client manager (SK.1.C) put it: "The methodology … of any project needs to be done together." Regarding the two conflicting opinions on responsibility (shared vs. divided), we found the contract failed in half of the cases involving shared responsibility. In only one case did the client (CN3.C) ask for shared responsibility: "We are in the same boat." However, the vendor (CN.3.P) on this failed deal did not consider shared responsibility to be important: "The point is, to have competencies and responsibilities clearly defined." The person also stated: "Really, the clients should be doing this, but since we are the executing organization, we are the ones legally responsible to be meeting the regulatory obligation, that's why we need to care for this." In total we found nine cases where vendors asked for divided responsibility, while only five clients mentioned this. Most of the dividing up of the responsibility involved defining who was responsible for services provided and did not affect the knowledge transfer itself. However, when asked specifically how responsibility should be handled in a knowledge transfer situation, one client (UD.1.C) reported on a successful knowledge transfer that setting exact dates for handing over responsibility is important: "I think a person is either responsible or not. But I clearly advocate that the person handing over responsibility support the person taking over, for a limited period of time…. It is important to clearly define who is responsible and when. I could even imagine that the knowledge receiver does the work, but the knowledge source remains responsible for some time. The responsible person and the one executing the work do not need to be the same. But these two areas need to be clearly assigned to the two persons who are knowledge source and knowledge receiver." Nevertheless, the cases generally reported joint support to be rather important as well. In summary, we find that responsibility needs to be clearly defined and assigned to individuals. Respondents across all the cases mention clear deadlines for when responsibility is handed over. However, adequate assistance needs to be provided to support any individual taking over responsibility for a given task. Such a joint approach supports participatory work, but also demands well-defined responsibilities. To encourage the supporting for the knowledge receiver an atmosphere of "success can only be achieved together" is important, though it should not distract from the importance of clearly defined responsibilities.

The other third-place aspect of IT sourcing in general, and knowledge transfer in particular, involves structure and process-oriented approaches. The structure and process aspects have been coded by a single code "structured, process oriented approach"[38]. Structure was found in five of the seven successful knowledge transfer cases, and the distribution between small, medium and large deals was nearly even. Nevertheless, a process- and structure-oriented approach was not supported unanimously. A large majority of informants supported a structured approach to IT sourcing in general and knowledge transfer in particular, such as one client manager (UD.1.C): " I've been participating in the strategy process for a couple of years. Therefore, I tend to favor the process approach." Others, however, disagreed: one manager (UD.2.C) favoring people-centric change management told us: "In my opinion, the process-oriented approach does not work. Knowledge transfer is initiated by the individuals involved and not guided through a process". A similar opinion was expressed by another client manager (UD.1.C) of the same provider: "Based

[38] The "structured, process oriented approach" entails any process related or objectively specified goal or task being mentioned.

on my experience, knowledge transfer is successful when the destination experiences a certain "low knowledge pressure". It (author note: the initiative to acquire knowledge) is quite the opposite (author note: opposite to knowledge source actively helping the knowledge receiver) approach; the knowledge receiver needs to actively acquire the knowledge." In addition, one manager explained that he generally favors process-oriented knowledge transfer for technical and domain-specific knowledge, but whenever cultural aspects and values are required, a change management approach is more appropriate: "If you require the transfer of cultural aspects, values, and behavior – culture and knowledge are quite close – then you need organizational change." In conclusion, structure and process orientation seems to be the preferred approach in most cases when either domain or technical knowledge needs to be transferred. However, people-centric strategies, such as having the knowledge receiver pull the required knowledge, are important when organizing a knowledge transfer process.

Finally, the lowest-ranking factor found to influence knowledge transfer is motivation. The motivation components were coded as "financial incentives"[39], "immaterial incentives"[40], "positive incentives"[41], "negative incentives"[42], "incentives"[43], and "asymmetric incentives"[44] (Figure 5-7).

[39] The code "financial incentives" relates to any text mentioning monetary rewards or penalties.
[40] The code "immaterial" is used in the meaning of contrast to financial, non-material and therefore intrinsic rewards.
[41] The code "positive incentives" relates to either financial or immaterial rewards.
[42] The code "negative incentives" relates to either financial or immaterial penalties.
[43] The code "incentives" relates to any incentives not further specified by the informant.
[44] The code "asymmetric incentives" relates different rewards for knowledge source and receiver.

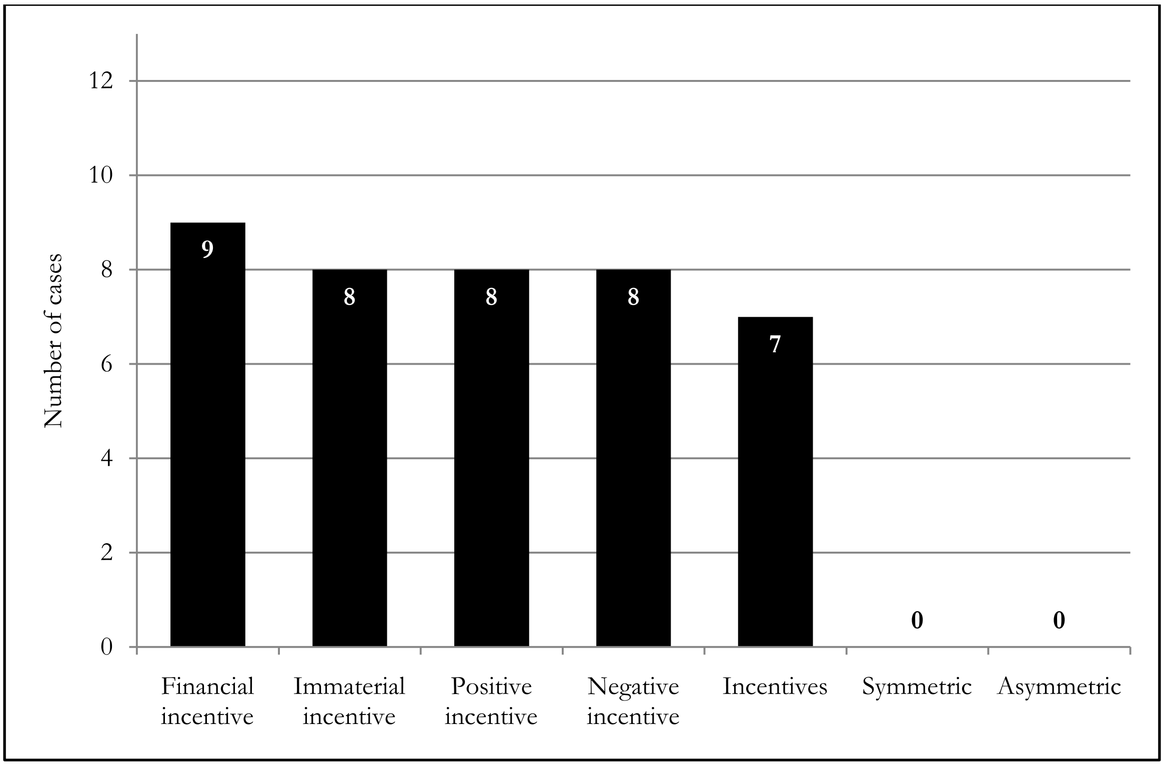

Figure 5-7: Aspects of motivation in IT sourcing knowledge transfer (n=13)

While only the code "financial incentives" was present in nine cases, aggregating codes shows that motivational aspects of some kind can be observed in all 13 cases in our study. In three cases - all of them equity deals - it is unclear whether financial or immaterial motivators were used. The variation here results largely from divided opinion over whether financial or immaterial incentives are preferable. In fact, seven cases used a combination of both incentive types, while one case used only immaterial incentives and two cases used only financial ones. Financial incentives were used in five of seven successful knowledge transfers, and only three used both motivation mechanisms. We found that in the five cases using financial incentives the incentives were used as positive and negative motivator. Four of these cases showed successful knowledge transfers, and only one did not employ immaterial incentives. Finally, we did not observe any symmetric or asymmetric motivation patterns. Although we could not identify any conclusive correlation between motivation scheme and deal size, we did notice that in two small deals and one medium deal, the knowledge-receiving organization motivated its employees, but the knowledge source organization did not. The dominant pattern of financial and immaterial incentives in combination with positive and negative components is best demonstrated by an example explained by one vendor manager (SK.3.P): "We are using a compounded salary system. Each employee is evaluated every three months. Part of the evaluation contains training goals; if these targets are reached the employee gets the corresponding salary component. It's 90% base salary and 110% if all targets are reached in the three areas of firm, team, and personal." The same manager further explained: "Kings are the most difficult, if knowledge leads to positional advantages and these individuals become irreplaceable. … once I had such a case, but the person is no longer with us, I couldn't accept this, the person is no longer here." In addition, many vendor managers – and some client informants - noted that when employees were transferred, most of the motivation lay in improved career prospects. The transferred employees moved from a cost center at the client firm into a profit center at the vendor firm. In conclusion, motivation for knowledge transfers is configured in IT sourcing initiatives similarly to how it is done in non-sourcing situations. Both financial and immaterial incentives matter and they are designed as positive and negative motivators.

Finally, as part of a large-scale IT sourcing survey separate from the present case study research (Schill and Voigt 2007), we asked 52 executive managers how they would rate the aforementioned factors in order of importance for facilitating successful knowledge transfer in an IT sourcing initiative (Figure 5-8).

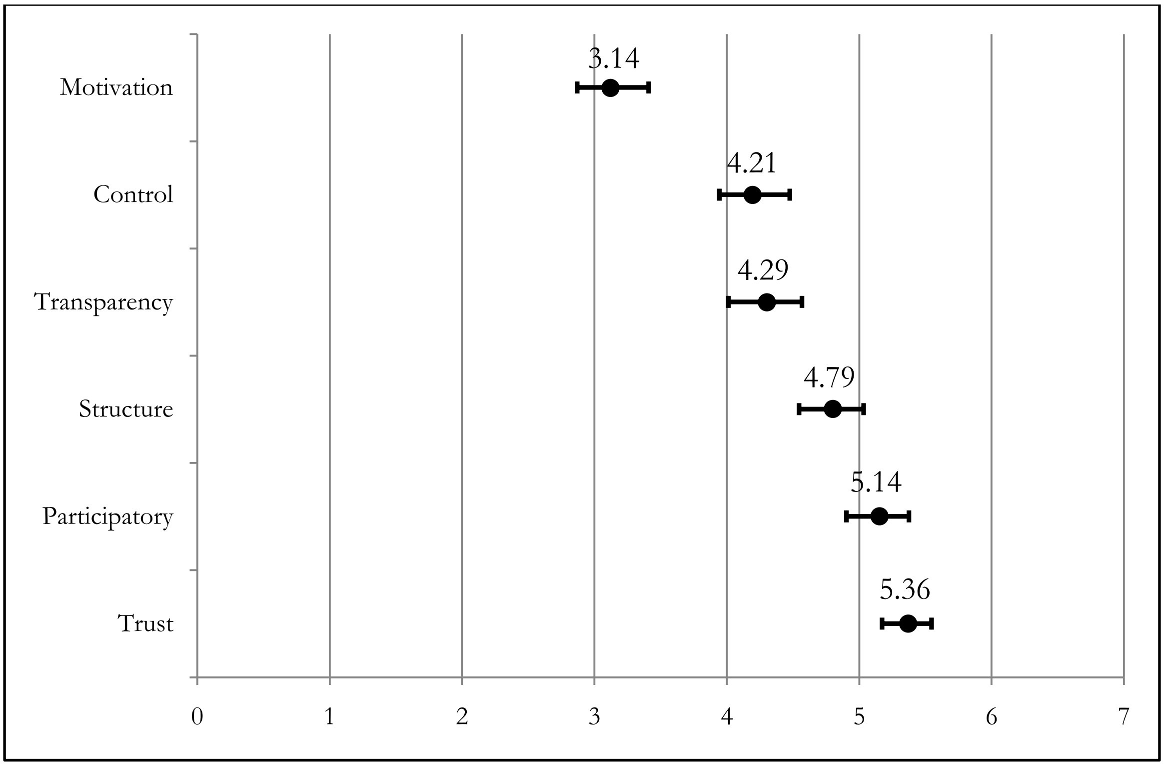

Figure 5-8: Expert opinions on factors that influence IT sourcing knowledge transfer. Experts used a 1-to-7 scale where 1 represents not importance and 7 represents very important (listwise n=14 from total of 45)

The results of the survey support the methodological principles identified in the present case study research. Moreover, the survey data shows a similar ranking for the various aspects, with the exception of control which did not score significantly[45] above 3.5. In addition, experts in the survey ranked control significantly[46] lower than trust. Nevertheless, control still appears to be still significantly[47] more important than motivation, which ranked even more significantly[48] different from trust. Both observations, this survey and the transcript analysis, rank motivation last. The remaining factors are ranked similar; structure and transparency remain in the middle and participatory and trust each gain relative rank, while control looses relative rank. Therefore, we interpret the survey data as generally supporting our interview and transcript analysis during the case study research since all factors except motivation score above 3.5. Even though some aspects such as control and participatory work surprised and need to receive further analysis in our pilot research. This concludes the findings regarding the methodological principles. The following section will present findings on the procedure model, information model, and role model.

5.1.3 Results regarding procedure, information, and role models

The procedure model has been coded against the IT sourcing cycle steps and the knowledge transfer process activities as described by Cullen et al. (Cullen et al. 2006) and Szulanski (Szulanski 1999), respectively. The details of each step and activity will be described in the following section. This section will use the codes to describe the order of execution and the relationship of the steps and activities to roles and documents. The roles were coded[49] and recoded as we discovered new roles during analysis of the transcripts. Documents relevant to the knowledge transfer itself were also coded as the documents in use became apparent. The following presentation will start with the description of the overall procedure model as observed in the 13 case studies; we have already published a preliminary version of these results (Voigt et al. 2007a). We will continue to present the relevant roles and relate them to activities in the procedure model where possible, after which we will discuss the documents discovered and their description and importance in the process.

Case study informants noted several IT sourcing steps in which knowledge transfer was conducted, and two are particularly noteworthy: the investigation and the transition steps (Figure 5-9). The steps immediately following these two in the IT sourcing cycle show a significant drop in frequency. In addition, the transition is the step mentioned most frequently when informants were asked to identify the step in which they conducted the knowledge transfer. The transition is

[45] Two-tailed t-test significance level of 0.161, excluding telephone responses, listwise n=16 from total of 45
[46] Two-tailed t-test significance level below 0.001, excluding telephone responses, listwise n=14 from total of 45
[47] Two-tailed t-text significance level 0.012, excluding telephone response, listwisen=14 from total of 45
[48] Two-tailed t-test significance level below 0.001, excluding telephone responses, listwise n=13 from total of 45
[49] Coding was performed by the author and verified by one master student for a sample of four cases. For additional information see section 4.1.3

preceded by two similarly high-ranking steps: design and select. The same relative ranking of steps is found when only cases of successful knowledge transfer are considered. The question about identifying the IT sourcing step in which knowledge transfer occurred could not be answered in all interviews, so its analysis was limited to only six cases.

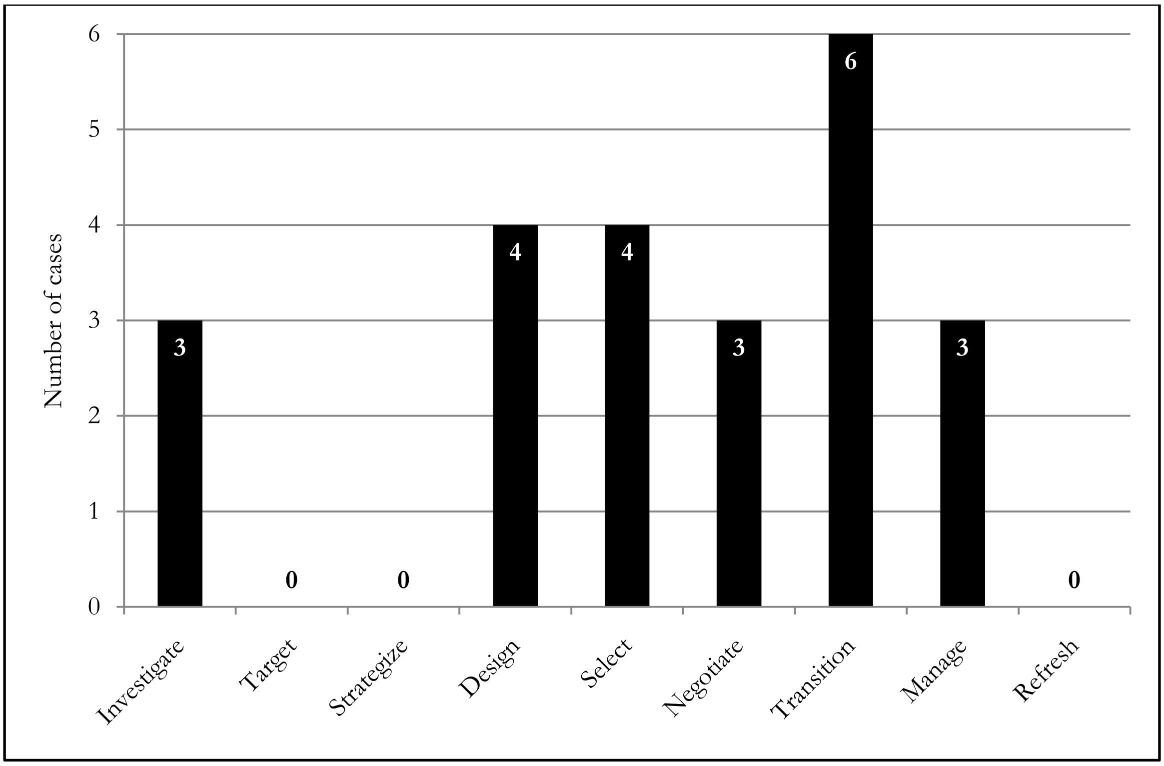

Figure 5-9: IT sourcing cycle steps related to knowledge transfer (n=13)

Beginning with the investigate step, we find that most of the knowledge being transferred is rather unspecific knowledge about market conditions. One client manager (UD.2.C) of a smaller deal noted: "In the beginning, it was basically about the market, vendor, and reference product knowledge." The design and select steps, in contrast, were related to more specific knowledge, since these two steps often involved the development of specific service level agreements. In the words of one respondent (UD.1.P): "Also during the SLA drafting some knowledge transfer took place." –This made it easier to identify which knowledge needed to be transferred and which could stay at the client firm. In addition, most organizations execute some kind of employee assessment during the design step or select steps. As one vendor manager of a large deal pointed out: "At the beginning of the project we had to turn in a resource plan regarding whom we needed when for know-how development and transfer". Another vendor manager (SK.1.P) mentioned that the vendor "created an inventory of people". Furthermore, the select phase helped clients to better understand the knowledge they needed to retain and which knowledge was likely to be easily transferable to a vendor by conducting site visits and tests. As explained by a client manager (UD.4.C) on a large contract: "We wanted to get to know our vendor's platform. Therefore, we sent some people to other firms running the same platform…" This occurred after the select step or sometimes even as part of vendor selection. Due diligence was defined by an informant of a larger deal (CA.1.C) to be a conduit of knowledge: "During the due diligence knowledge transfer took place." Yet most cases showed the transition step as the most important step for knowledge transfer. While the design and select steps laid the groundwork for the knowledge transfer, actual transfer activities were conducted during the transition step (UD.4.P): "Just before the project initiation and about three months before the end. That's when knowledge transfer has been most intense. In between, things were less structured; (author note: the knowledge transfer process produced) more of a learning-by-doing environment." However, in many cases the knowledge is transferred in terms of employees being moved from one firm to another (see section 5.1.4 for details). As one client (UD.4.C) put it: "After the contract signature, the knowledge needs to be exchanged between the two parties. In our project we chose to transfer employees." Finally, a few cases can be found where knowledge is reported back to the client after the transition phase has concluded. One provider (UD.1.P) explained it this way: "The second knowledge transfer is conducted when the reporting is handed in and the data is analyzed." While such knowledge transfers during the manage step are rare, it remains unclear whether clients appreciate such continuous knowledge transfers during IT sourcing initiatives. One large client of the same vendor seemed to be rather satisfied with the incoming knowledge (UD.1.C), saying "The actual knowledge gets transferred rather late, during or after the reports are send out," whereas a smaller client (UD.3.C) of a failed IT sourcing and the related knowledge transfer would have liked not to know more details: "But we would rather like to limit this (author note: knowledge transfer) to a minimum" Finally, while the refresh and termination phases have not been directly connected to knowledge transfers, one client manager explained how he ensured that any knowledge would be returned to his firm after conclusion of the IT sourcing contract. The manager (UD.4.C) in this large contract ensured that the IT sourcing contract contained a clause requiring the vendor to transfer all knowledge and employees back to the client upon contract termination: "We reached an agreement with all contract parties that we can have a say if one of our former employees resigns with them. … The vendor is required to allow people to transfer back to us if they want to do so; they need to let them go, without seeking damages. "

In reference to the IT sourcing cycle, we also observed which of the knowledge transfer phases were mentioned during our interviews. In 11 of the 13 cases, the initiation phase was mentioned, followed by the ramp-up phase in seven cases (Figure 5-10). The implementation phase, mentioned six times, is followed by the integration phase in last place, mentioned four times. The same ranking results if only cases with successful knowledge transfer are analyzed. The whole transfer process lasted between 12 months for 300 knowledge receivers (CA.2), to 18 months for 117 technical users and up to 500 business users (UD.4).

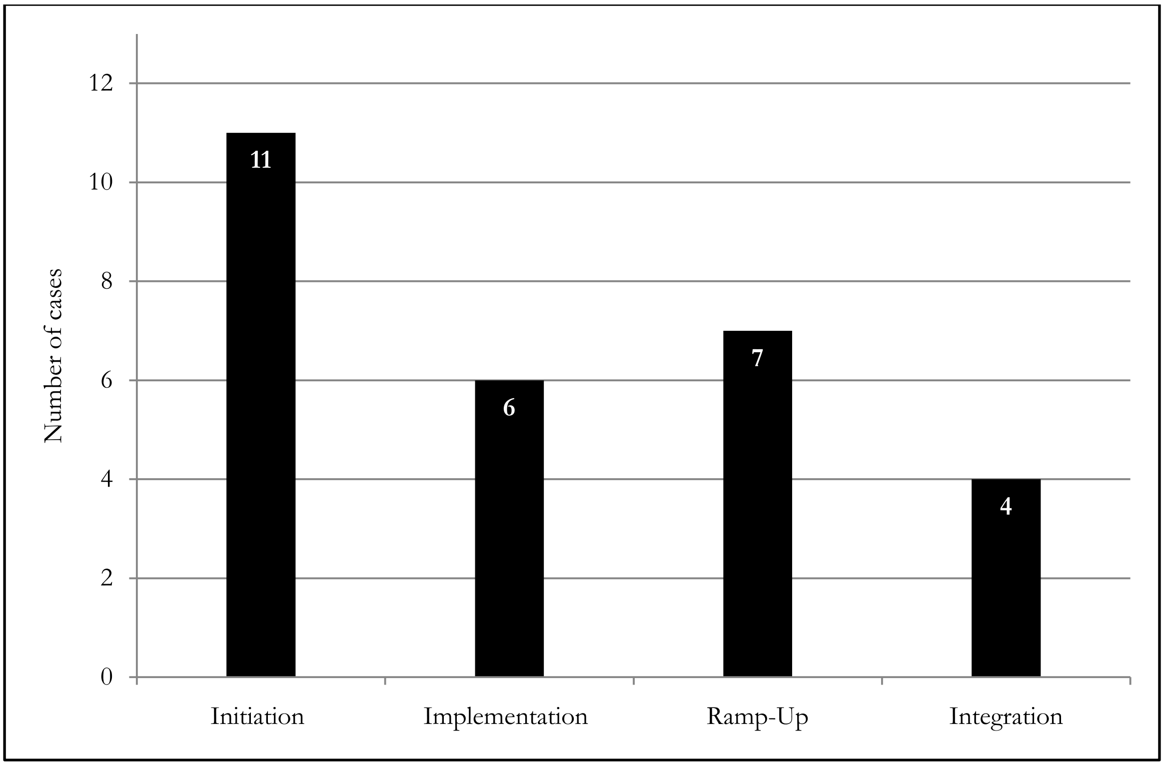

Figure 5-10: Knowledge transfer phases in the IT sourcing initiatives in this study. Sorted by execution order (n=13)

The initiation phase was often characterized by skill profiling of employees, such as that described by the vendor manager of a large contract (CA.1.P): "During the due diligence, people, systems, and software were profiled; this took quite some time." Another vendor manager (UD.4.P) noted the planning activities that were conducted: "In the beginning, we had to provide a resource plan detailing whom and when we needed people for knowledge development and transfer." The typical documentation - question-asking and classroom training activities - were observed less often, but they did happen. As one client manager (UD.4.C) summarized: " … (author note: knowledge transfer) through classroom training, employee development, and daily business… For the end users we used special e-learning tools. We bought the e-learning software and filled it up with software, domain, and application know-how". The second most frequent phase turned out to be the ramp-up phase. Indeed, many organizations chose to allow knowledge receivers to apply their knowledge either in simulated test environments: "In addition to the e-learning software we used a test system where the employees could train on their own"

(UD.4.C), or by working under the supervision of the knowledge source: "First, you sit behind the person, then you sit next to him and then the person sits behind you. We had foreign resources coming to the client location doing the work shadowing" (CA.2.P). Finally, the integration phase was least common, and its purpose was not always well understood. As one respondent commented (UD.4.C): "It's not all that helpful if the current knowledge is conserved with the knowledge source. People need to take training and develop themselves." However, some vendors did manage to integrate knowledge and to further develop the knowledge in cooperation with their clients: "Once the project was finished we developed the knowledge regarding the templates from the provider, especially the few and important details regarding domain knowledge. Now we are able to work well with the product provider" (UD.3.C).

By relating the number of knowledge transfer phases to whether the knowledge transfer was successful, we found that successful transfers occur more often in cases involving more knowledge transfer phases.

No. of phases executed	Successful knowledge transfer			Unsuccessful knowledge transfer		
	Client	**Vendor**	**Cumulative**	**Client**	**Vendor**	**Cumulative**
No phase	SK.2	None	None	CN.3; CN.1; CA.3	CA.3; SK.3	CA.3
One phase	SK.1; CN.2	SK.2; CA.1; CN.2	CN.2; SK.2	UD.2; SK.3	CN.3; CN.1	CN.3; CN.1; SK.3
Two phases	UD.1; CA.2; CA.1	CA.2	CA.1; CA.2	UD.3	None	None
Three phases	None	SK1	SK.1	None	None	None
Four phases	UD4	UD.1;UD.4	UD.1; UD.4		UD.2; UD.3	UD.2; UD.3

Figure 5-11: Comparison of how many knowledge transfer phases were observed in cases of successful and unsuccessful knowledge transfers (n=13)

Figure 5-11 compares the cases showing successful knowledge transfers with those where the transfers were unsuccessful. In addition, the number of knowledge transfer phases found in client and vendor interviews is shown for each case, as well as the cumulative number of phases per case, corresponding to the joint set of phases mentioned by either client or vendor results in the cumulative number of phases. The results indicate that the more structured the knowledge transfer, the more likely it is to be successful. Moreover, we discovered that knowledge-receiving organizations (i.e., vendors) in five cases reported more knowledge transfer phases than their clients, suggesting that structure is more important to the knowledge receiver than to the source. However, these results need to be carefully examined, since the UD cases may be biased by the vendor informant in favor of a more complex knowledge transfer process. Nevertheless, the cumulative number of phases per case shows the same basic result even if the UD cases are removed from the analysis: cases where two or more knowledge transfer phases could be identified were more successful than cases where less than two phases were used.

While we were able to identify several roles, few specific roles with regard to knowledge transfer were found. Often, the relationship was indirectly established through hierarchical dependencies. Therefore, the roles profiles and positioning in the knowledge transfer process remain largely undefined, except for the five most frequent roles found in all types of deal size. These roles are: knowledge manager, knowledge source, knowledge receiver, supervisor knowledge receiver, and project manager of knowledge transfer (Figure 5-12). The three roles of program manager, program office, and coach were mentioned only in the largest deals, while a project sponsor and a supervisor of the knowledge source were mentioned in medium and large IT sourcing contracts. Hence, smaller deals do not necessarily require fewer roles, but rather fewer personnel to manage a knowledge transfer. We found that many of the roles also exist in small knowledge transfers, but they are carried out by one person. Most often the knowledge manager role, which occurs more frequently in smaller deals than in medium or large ones, fuses with the role of the project manager of knowledge transfer; this role corresponds in many cases to the sponsor of both the knowledge transfer in particular and the IT sourcing initiative in general. One client manager (UD.1.C) who was personally responsible for a small IT sourcing initiative described how he collected the most knowledge and, since he was the sponsor of the IT sourcing initiative, he also supported and managed other employees whenever problems arose: “Yes, that (author note: the knowledge manager) is me. I usually don’t know every detail… But historically I’ve said that all mails need to go through me. I wanted to be on all CC (author note: carbon copy email) communication. Whether I will take action or not is up to my discretion, but I wanted to be informed about everything. I want to know about all problems, it’s not like I would want to solve all of them, but I wanted to know all of them.”

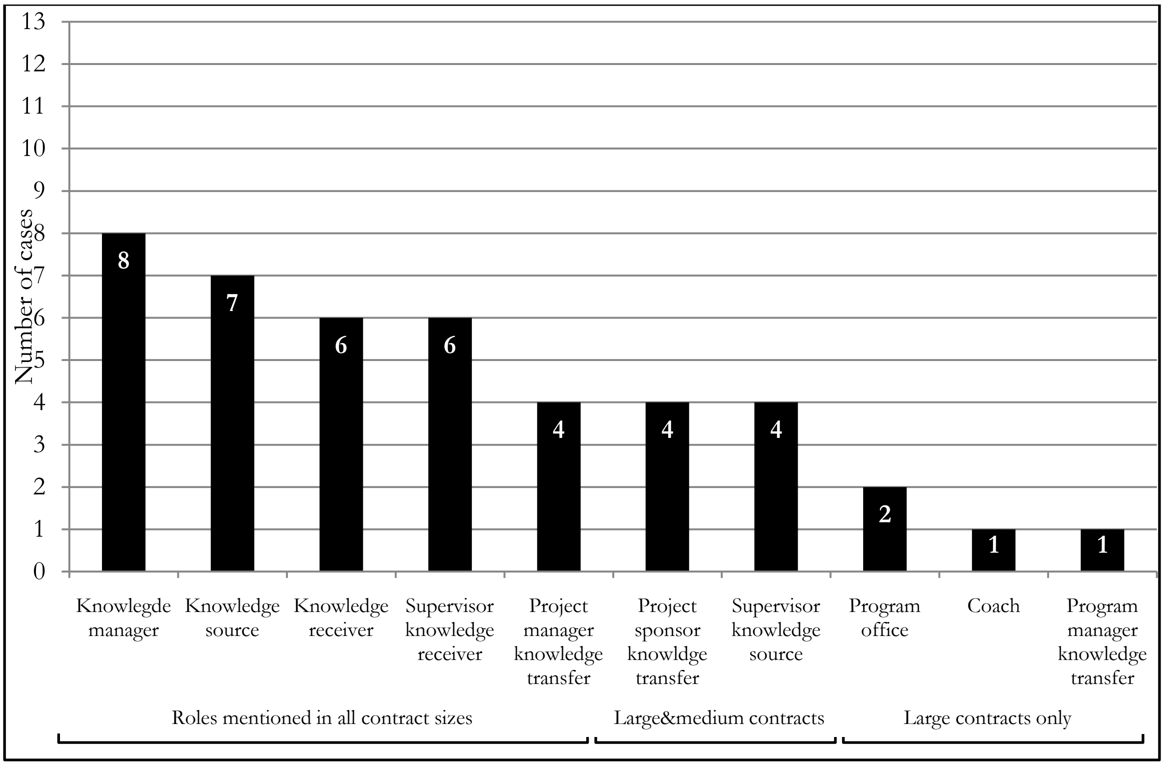

Figure 5-12: Roles related to knowledge transfers in IT sourcing initiatives (n=13)

Although eight cases mentioned a knowledge manager, two questioned the need for such a role. One vendor manager (CN.2.C) of a larger IT sourcing contract mentioned a knowledge manager role, but did not seem to believe in its usefulness: "On paper there is such a role that should support the effortless information flow between vendor and provider." More direct opposition to the role of knowledge manager was expressed by a vendor manager on a small contract (UD.3.C):"No, we don't (author note: have a knowledge manager). Individually we store some procedures in each division, but it is not done systematically". Such observations make the knowledge source particularly important. These knowledge sources were often profiled; they were identified, as one respondent (CA1.C) noted, through "identification of key people (author note: knowledge sources)" They were then asked to support the knowledge receivers: "We had foreign resources coming to the client location doing the work shadowing (author note: a technique to do knowledge transfer)." (CA.2.P). This team of knowledge receiver and knowledge source was led by a project manager, often the knowledge receiver's direct superior; i.e., team leader. As one provider manager (SK.3.P) told us: "This is a responsibility of the team and the team leaders; they need to divide the know-how." It is apparent that, whereas the client initiated the IT sourcing initiative, the vendor (i.e., the knowledge receiving organization) maintained control over the knowledge transfer process through the project manager and supervisor knowledge receiver. However, in all four cases the knowledge transfer sponsor was a client manager; therefore the process was initiated by a client (UD.4.P): "The client has defined in advance which functionality requirements (author note: and therefore knowledge) had to be provided by the new platform." Finally, the program office and program manager roles were present only in the largest IT sourcing initiatives. These large IT sourcing initiatives had to coordinate many different knowledge transfers at the same time. As different respondents explained, "We maintained a training division" (UD.4.C), and "For education purposes they (author note: the client personnel) were sent to our (author note: the providers) service managers for coaching" (UD.4.P).

The third important model, the information model, was described only briefly by our informants. Few documents were mentioned, with the exception of the contract, request for proposal, request for information, service level agreements, and skills catalog. Except for the skills catalog, these documents were not directly related to knowledge transfer, even though the contract might contain certain clauses relevant to knowledge transfer. None of the documents could be studied in detail, and their content and attributes were discussed only very briefly, except for one service-level agreement (SK.1.P). The techniques to produce the documents were not disclosed by our interview partners. However, some documents could be matched to specific IT sourcing phases. The following paragraphs will summarize the details regarding documents relevant to knowledge transfer that we observed during our research.

All but one successful knowledge transfer case produced some kind of skills catalog to determine which knowledge to transfer. The one exception transferred all client employees, but only after the client's human resource department carefully selected the employees in advance. As the vendor manager (CA.2.P) explained: "The client decided it. He looked, who did the work before and these were the people who came over." The analysis of the procedure model presented earlier in this section shows that the creation of the skill catalog occurs during the design and select IT sourcing step and can be found as well during the initiation phase of the knowledge transfer process. Regarding the content of the skills catalog, only one interview participant reported relevant attributes. The client manager (UD.4.C) told us: "This (author note: the skills catalog) is a slightly more detailed CV: skills when hired and development, including trainings, etc." The skills catalog also contained quantitative data on employee's skills, as can be deduced from the comments of a provider manager (UD.4.P) on the same contract: "These (author note: skills catalogues) were analyzed quantitatively and qualitatively." However, the skills catalog seems practical only for larger contracts, as suggested in the comments by one small contract client manager (UD.1.C): "In this area, we are too small and do not need a catalog. I know the people involved, and I just approach them when necessary".

In addition, some information regarding the IT sourcing contract can be gathered directly from the informants, as well as from the methodological principles detailed in the previous section:

- Five of the seven cases of successful knowledge transfer involved detailed service level agreements, suggesting that detailed contracts are more successful.
- In all successful knowledge transfer cases, except in one case involving a small deal, the firms prepared a future organizational schema in advance. Some of these organizational charts were drawn up by the interview participants, and they turned out to be remarkably detailed in outlining roles, responsibilities, and reporting channels.
- We concluded from the methodological principles that as part of the future organization, the roles and responsibilities of the knowledge source were probably well-defined. In addition, all of the four medium or large successful knowledge transfer cases defined contract terms in advance for the termination of the IT sourcing agreement.
- The principle analysis shows that contracts probably contained a well-defined business case – including one in favor of knowledge transfer – and pre-agreed penalties for contractual non-compliance. More specifically, we found that in three cases of successful knowledge transfer, the firms chose to rely on oral or very loosely defined agreements regarding the knowledge transfer itself.
- All of our informants talked about the creation of various types of documentation, including process, software architecture, and system documentation. Unfortunately we were unable to analyze these documents and cannot report on their level of detail.

Therefore we conclude this section and will continue to present the observed activities, techniques, and tools from our case study research.

5.1.4 Results regarding activities, techniques and tools

The previous section already mentioned some of the activities observed during the various knowledge transfer phases in an IT sourcing imitative. This section explains the activities in more detail and brings together the various techniques required for the successful completion of each activity, culminating in the production of the required document. The activities in this section are coded according to the literature presented earlier, primarily that on activities as captured in the phases of Szulanski (Szulanski 1999), as well as on our observations in this case study. Conceptualization is the final coding schema for the activities. The techniques discussed in this section are structured along the framework of Nonaka and Takeuchi (Nonaka and Takeuchi 1995) and come from the earlier list of techniques presented in Chini (Chini 2004). These techniques were extended by six additional concepts that we discovered during our observations. The concepts were so frequently observed in our data that we have to assume their importance in the context of IT sourcing of knowledge transfer. These additional codes were: "document creation"[50], "document collection"[51], "general purpose office software"[52], "knowledge store"[53], and "employee transfer"[54]. Figure 5-13 presents the frequencies of the techniques measured in our interviews.

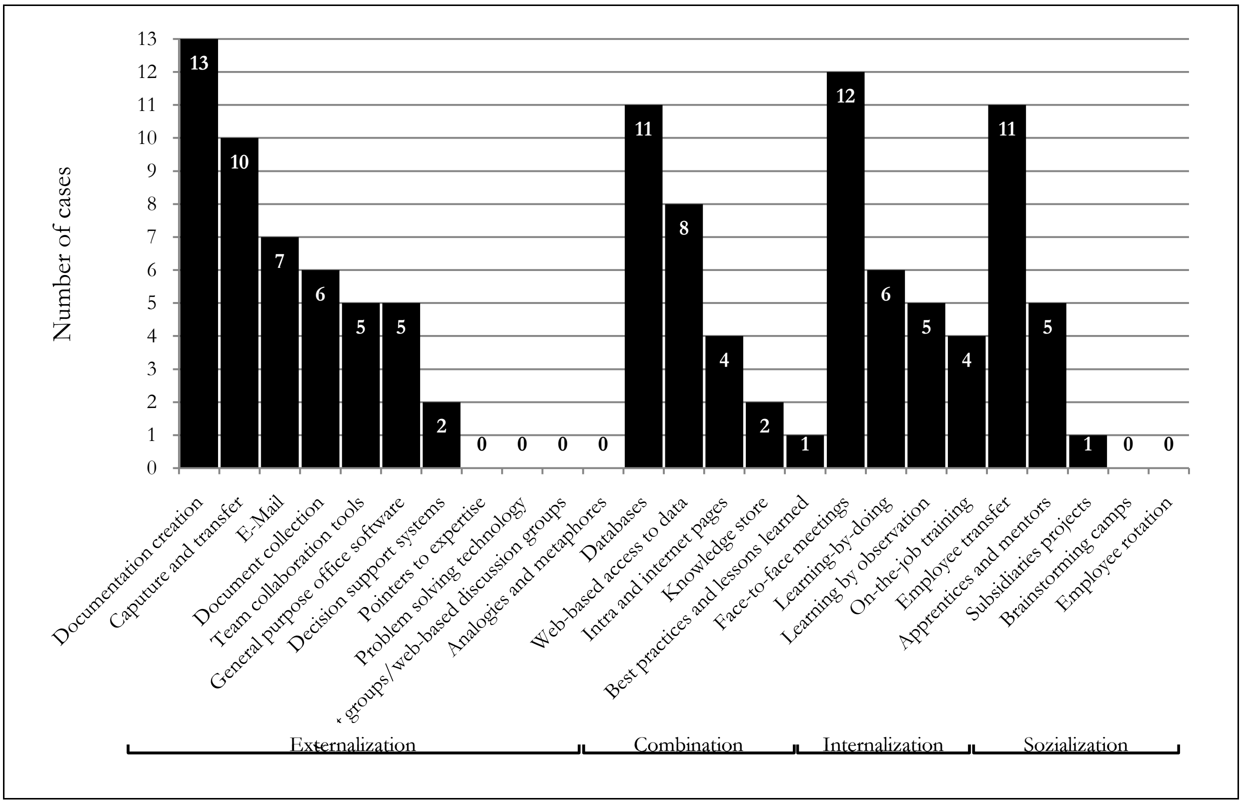

Figure 5-13: Knowledge transfer techniques relevant to IT sourcing initiatives (n=13)

In contrast to the internalization knowledge transfer techniques discovered for knowledge transfers within organizations (Chini 2004), externalization techniques predominated in our study. In research by Chini (Chini 2004), the top ten knowledge transfer techniques found within organizations included all four internalization techniques, and only the technique ranked 10th was classified as a socializing technique. In contrast, our case study of knowledge transfer between firms revealed that five of the top nine[55] knowledge transfer techniques were related to externalization, with a socializing technique ranked third. Only two internalization techniques

[50] The "document creation" code refers to any activity that is producing documentation for the means of knowledge transfer but without mentioning specifically how these documents are handled.
[51] The "document collection" code refers to any activity that is searching and aggregating existing document.
[52] The "general purpose office software" code refers to text that mentions software tools such as word processing or spread sheet software.
[53] The "knowledge store" refers to a software tool serving users to load and download information resources and managing these resources.
[54] The "employee transfer" code was used for text references mentioning the take-over of employees by the vendor.
[55] The ranking of the final tenth element is not possible due to several equally ranked candidates.

ranked within the top nine based on our research data. In addition, studying differences between deals involving larger or smaller contract volumes showed that all large deals practiced document collection, employee transfer, and face-to-face meetings. In contrast, small deals used these techniques less often, but employed general-purpose office software and e-mail more often; the small deals also preferred on-the-job-training over learning-by-observing. The opposite was true of larger deals, which preferred observation over on-the-job-training.

When comparing results from successful knowledge transfer cases, we found that six of the seven successful cases practiced document collection and four used on-the-job training. Furthermore, out of the many socialization and combination techniques, only employee transfer and databases were mentioned by more than a few cases for each IT sourcing design dimension. Web-based access and mentoring techniques were used mostly in larger contracts. In the following paragraph, we will detail how firms practiced the top nine[56] techniques in each individual IT sourcing context. We will also explain how knowledge transfer techniques differ from knowledge transfers within firms.

Starting with the externalization techniques, we found that most cases mentioned document creation. However, managers on small contracts in particular noted that they felt too small to acquire and document the relevant knowledge for the given contract: "But it is not internally distributed or documented. It has never been the goal to acquire knowledge from the provider regarding this business area. We are just too small for this" (UD.3.C). Even though the contract failed, the same manager noted that he began to document some knowledge on his own, strictly for personal use: "I have started to document some aspects of the project... it is not a requirement, but makes work easier." In addition, we found that most application developments and cases of business process IT sourcing showed a lower frequency of document collection, or of capture and transfer from the knowledge source organization to the knowledge recipient. This may be because application outsourcing often results in development of a new platform from scratch (UD.4), in which case, some knowledge no longer qualifies for transfer, but serves instead to build up new knowledge. This re-engineering required domain-specific knowledge more so than technical knowledge: "Regarding the technical issues the provider already had a good understanding" (UD.4.C). In contrast, an infrastructure project by the same provider involved very structured documentation efforts, as the vendor manager (CA.2.P) explained, "In the transformation stage, we transform and develop the client's documentation according to our standards." More generally, the capture and transfer code often turned out to be very similar to codes for document creation and collection, but the latter two allowed us to establish more

[56] The ranking of the final tenth element is not possible due to several equally ranked candidates.

precisely which activities were involved. Therefore, the capture and transfer code was used whenever less specific activities were described. For example, one vendor manager (CN.1.P) indicated only that documents were transferred, but did not explain whether the documents already existed or were newly created :" there is a user manual, which is certainly covered by us (author note: the provider)" Finally, the second most frequent of the externalization techniques was e-mail. However, we found that e-mails, although used for knowledge transfer, often only transferred knowledge regarding the project status: "E-mail contact...to be up to date on current issues" (UD.2.P). This knowledge type is of limited temporal value over the lifetime of the project. Knowledge that had to outlast the present IT sourcing initiative was mostly transferred in documentation efforts as outlined above. Some firms even assigned the task of the documentation effort explicitly to the knowledge receiver (UD.4.P): "Often it is better if the one taking over the knowledge gets to write the documentation under supervision of the knowledge source … "

Face-to-face meetings of some sort were the second most popular technique overall and the most frequent internalization technique. These meetings allowed the knowledge source and knowledge receiver to clarify issues with the documentation "If there are ambiguities, we conduct meetings…" (UD.3.P), and discuss problems encountered while using the knowledge in a learning-by-doing trial "when they have questions and are on site, it is easier to find someone to speak to" (CN.1.P). This finding highlights the importance of working at the same location for at least some time during the knowledge transfer. Some organizations even documented the meetings for future reference: "During the transformation phase we had personal meetings and workshops with the provider to sort things out. These meetings were documented" (CA.1.C). One vendor manager in a small deal speculated that the time for these workshops would be 10-12 hours for each party: "For the knowledge transfer, we required three days in total with a workload of ten to twelve hours for each organization" (CA.3.P).

The difference between knowledge transfer between firms and knowledge transfer within firms is most salient when considering the socializing techniques. While firms employ many mentoring models for knowledge transfer within the firm, these are only seldom used in IT sourcing initiatives. Indeed, less than 50 percent of the cases in this study reported any mentoring activities. None of the other commonly identified socializing techniques were prominent. Employee transfer, however, was mentioned often. While interview partners on small contracts usually did not practice employee transfer, they advocated this technique: "So, knowledge transfer through employee transfer" (UD.2.P). Large contracts practiced employee transfer; in fact, they organized it carefully: " … when and whom we need for the knowledge transfer. There was a detailed plan" (UD.4.P). (See also 5.1.2 regarding employee motivation). One vendor manager, despite a failed knowledge transfer and IT sourcing initiative, claimed that employee transfer was a key factor in the success of the knowledge transfer in the IT sourcing initiative: "That's where we also took over some employees. They are with us now, the knowledge is therefore here…" (CN.3.P). Another vendor manager (CA.1.C), however, warned that the transfer of too many employees may result in loss of leadership: "Only a small management layer remained after the transition phase. Therefore, we experienced a certain loss of leadership."

Ranking as high as employee transfer was database storage of knowledge, an important combination technique. Moreover, judging from the relatively high frequency of web-based access to data, many of the databases were made accessible through common inter- and intranet software. Some vendors even shared these databases with their clients through extranet solutions (CN.2.C): "A big step in the right direction was recently accomplished by the vendor's extranet." This also reduced e-mail overhead (SK.3.P): "you don't have to send e-mails." As seen with the externalization techniques, however, databases were mentioned in most interviews, but were not used by most of the smaller firms. One respondent (UD.1.P) noted, "An IT tool for knowledge transfer does not exist," even though such a tool was being deployed at the time of the interview.

To summarize the aforementioned techniques we re-coded our data with more general activity codes and thereby connected activities with techniques, documents, and in some cases even relevant roles. The activities represent the nature of the discovered techniques. First, there are two preparation activities: knowledge identification and knowledge transfer planning. These two activities are not strictly knowledge transfer activities, but rather they represent an essential phase of knowledge transfer (compare the initiation phase in section 5.1.3). In an IT sourcing context, the self-study activity follows and is composed of the classic externalization techniques outlined in the previous paragraphs of this section. The following tandem activity contains techniques used to internalize the knowledge – including some socializing techniques such as mentoring and coaching - and it is followed by two types of combination activities: project and ad-hoc reflection[57]. According to this classification of activities, the frequency distribution shows the pattern illustrated in Figure 5-14.

[57] The observed sequence of techniques may appear to be in conflict with the "knowledge spiral" proposed in Nonaka, I., H. Takeuchi. 1995. *The knowledge-creating company : how Japanese companies create the dynamics of innovation*. Oxford University Press, New York, NY. However, it should be kept in mind that the behavior observed here relates not to knowledge creation, but to transfer of existing knowledge.

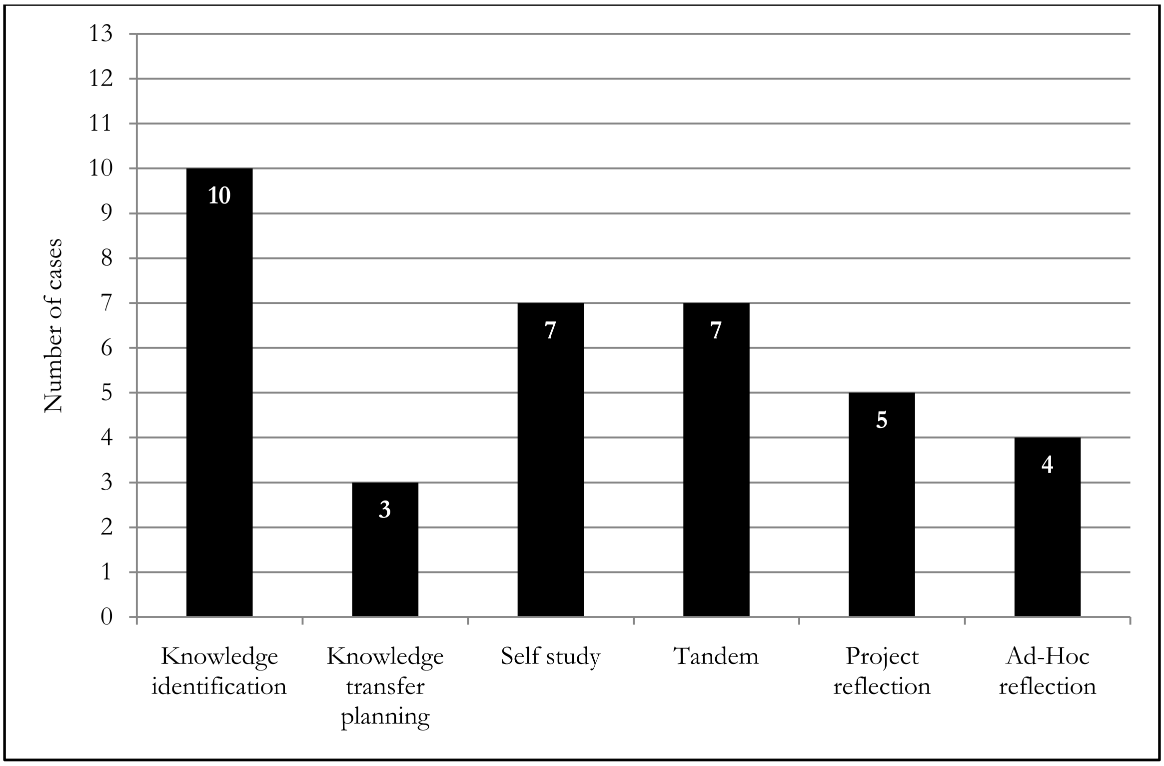

Figure 5-14: Knowledge transfer activities in IT sourcing initiatives[58] *(n=13)*

Of the activities identified, knowledge identification was practiced in ten cases. Many cases linked knowledge identification with the due diligence process of the IT sourcing life cycle. However, one vendor manager (CA.1.P) suggested a two-stage knowledge identification setup to improve the quality of due diligence: "In a first step before the contract closure and in a second during the transition phase." The techniques relevant to knowledge transfer are skill identification and preparation of a skills inventory, as explained by one vendor manager (CA.1.P) of a large IT sourcing contract: "During the due diligence phase all people, systems, and related software were enumerated, which took quite some time." In all cases, the skills enumerated belonged to the knowledge sources. Further, the responsibility for knowledge identification was assigned by one vendor manager (SK.2.P) to the team supervisors: "This has to be felt by the team supervisor; he needs to know which knowledge is critical." The skills were collected and used to create a skills catalog. The content was gathered using standard, presumably human resource guided processes: "Our HR division manages skills catalogues for each employee" (UD.4.C), including questionnaires :"Through standard questionnaires" (CA.1.C). The human resource function of either client or provider was usually involved during knowledge identification, as was apparent from a transition plan provided in one case (SK.1.P). We noticed that smaller IT sourcing initiatives, which often did not involve employee transfers, did not

[58] The activity names have been in part chosen based on our pilot research and have been validated in particular with the division head C2 and method engineer ME2.

produce any documents summarizing the relevant knowledge to be transferred. Instead, smaller cases relied on requirements write-ups in order to document the relevant knowledge: "We conduct an evaluation period to better understand the client requirements. In the beginning, we need to understand which data and which processes are used by the client" (UD.2.P).

Much less frequently, IT sourcing cases were found to plan the knowledge transfers in terms of resources and time. While quite a few firms practiced or advocated the employee transfer technique, fewer planned the employee transfer apart from skills identification. The three exceptions in which the knowledge transfer was planned were all successful in their IT sourcing and knowledge transfer. While one case planned only for documentation as part of the proposal offered to the client, two cases drew up detailed resource plans. In one of these cases (SK.1.P), we were allowed to study the transition plan and we noticed that technical knowledge was transferred only after the human resource department had begun to transfer employees to the vendor. The entire knowledge transfer, including skill assessment, introduction to new career options, and transitioning of staff, systems, and relevant documentation was executed as an individual work stream of the project. In the second case involving detailed resource plans, one vendor manager (UD.4.P) explained how a defined document was created as a result of the planning activities: "But when and who was required was defined in detail. A milestone plan contained the information which concept, and which document until which date." The progress of these milestones was monitored every two weeks by roles related to the knowledge transfer project manager and the knowledge manager.

The self-study activity was one of the two activities ranked second in frequency of occurrence. We found self-study to be often related to some form of document creation technique: "Then we conducted an IT due diligence, made an inventory, and reported what was missing per server and application and created new documentation where necessary" (SK.1.P). Many provider managers noted that they often had to act alone in understanding their client's embedded knowledge such as processes and system relationships: "The client had a process that we did not know; therefore, we had to acquire the knowledge on our own" (SK.3.P). In one case, we noticed the use of electronic learning environments: "We bought e-learning software and filled it up with domain and application know-how. Then we made this available to the employees" (UD.4.C). One manager suggested that the knowledge receiver should be given the task of creating the new documents: "Often it is much better if the one receiving the knowledge gets the task of creating the documentation on supervision of the knowledge sources, and not the other way around" (UD.4.P).

Tandem activity was as frequently observed as self-study. This activity was most frequently related to techniques of dyadic human interactions such as face-to-face meetings, rather than document creation: ”In the project phase, we had frequent contacts and knowledge exchanges” (UD.3.C) or question answering: ”It’s a question-answer game” (UD.4.C). In some cases, mentoring techniques were linked to the tandem activity: ”In certain situations, I could make someone available (author note: to help the vendor); much more is not possible” (SK.3.C). One manager explained how he would design the hand-over of responsibility during the tandem activity: ”I can clearly assert that the person handing over the responsibility supports the knowledge receiver for a given period of time” (UD.1.C).

The last two knowledge transfer activities - project and ad-hoc reflection - represent combination techniques such as tests, reviews, error and issue tracking, and feedback meetings. The primary purpose of these activities is to expand and deepen existing knowledge. Our research revealed that these activities provide an opportunity to transfer some knowledge to the client when the IT sourcing initiative enters the manage process. One client manager (SK.2.C) pointed out how project reflection worked at his firm: “Yes, yes, it is very successful. In mid-2004 we came together and looked at issues we could improve. Together with representatives from the vendor, we made a list. This September we are going to do the same thing.” The approach was similar to the one in the following smaller case: ”After every production cycle we prepare a debriefing for the client, to evaluate what worked and what did not work well on our and their side. In addition, we suggested improvements for the next year” (UD.1.P). The ad-hoc reflection was practiced only in a very few cases and entailed solving problems at the time they occurred. One vendor manager (UD.1.P) described the activity in the following way: “If such a case occurred, we look into it (author note: immediately).”

We will finish this section by looking at the tools identified in our cases. In general, we observed very limited usage of electronic support tools. Some cases outlined specific software packages for document storage, such as Lotus Notes (SK.2.P), others indicated the use of “virtual team-rooms and shared work places, where teams of three collaborated” (CA.1.P), and still others used physical places to collect documents: ”Special physical rooms were prepared at the client site where all information was available in paper and binders” (CA1.P). Others explained the infrequent use of electronic document storage in this way: “In the beginning we used a shared document solution, but it was rarely used by the employees” (CA.1.C). Some advised explicitly against excessive reliance on electronic media and instead favored physical facilities for document sharing and access: “You should never do the knowledge transfer remotely with web-tools and collaboration solutions” (CA.2.P). Nevertheless, the majority of vendor managers appreciated the functionality of document storage systems: "We have one system for information management which allows us to track documents back to 1995" (CN.1.P). In contrast to documentation storage, preparation of the skills catalog was consistently reported to involve several electronic tools, such as HR topologies (SK.3.C) and knowledge maps (CA.1.P). Moreover, dedicated training for self-study was also provided through electronic tools such as electronic learning environments (UD.4). In summary, electronic tools were used, but some informants questioned their usefulness, and the use of these tools varied depending on the knowledge transfer activity. To finalize the cross-case findings, we will now examine what claims of our working previous assumptions and constraints are supported and refuted by our results.

5.1.5 Summary of case study findings

This section will revisit the consolidated assumptions and constraints for a knowledge transfer method in IT sourcing initiatives. The assumptions and constraints presented in Figure 3-12 were used as the basis for assessing the evidence collected throughout the case studies. We will reference these assumptions by indicating the list items in brackets throughout this section. After analyzing 30 interviews from 13 case studies with more than 70 different codes, we are able to assert some assumptions in more detail and at the same time dismiss other assumptions. Specifically, we analyze with regard to how individual constituent method elements are best designed to create a successful IT sourcing knowledge transfer according to the specified research gaps. This section is organized to outline the changes to the originally proposed assumptions and constraints, following the sequence presented in Figure 3-12. Then the section will present an overview table of the most important aspects discovered so far and any unresolved issues.

We can assert that most pre-conditions derived from our literature review were also observed in the cases studied here. In our presentation of observed methodological principles (section 5.1.2), we showed that, albeit not often (Figure 5-3 last column), if it is tracked at all, the success of knowledge transfer is measured based on work performance (assumption item 1.1). In addition, the majority of cases (10 of 13; Figure 5-14 first column from left) were found to involve some sort of activity to identify knowledge (assumption item 1.2). Therefore, the knowledge transferred in these cases was identifiable. Since many cases supported knowledge transfer using employee transfers (Figure 5-13, third from right), the task responsibility transfer (assumption item 1.3) was therefore observed as well. However, whether employee transfer alone ensures knowledge transfer success is not clear. Limiting the analysis to one-time transfers (assumption item 1.4) is plausible and practical, since twice as many knowledge transfers are connected to the

IT sourcing transition process as to the management process (Figure 5-9, second column from right). We established that it is practical to claim an existing organizational infrastructure and knowledge management organization (assumption item 1.5) for the following reasons: 10 of 13 cases had some sort of information system, such as a database (Figure 5-13); eight of 13 cases involved a knowledge manager; and knowledge identification was practiced frequently (in 10 of 13 cases), and it involved skill assessments. Since some informants linked skill assessments to a human resource function, this is a plausible explanation of why human resource functions were involved in most knowledge identification efforts and therefore in most cases. Most of the demands regarding an existing IT sourcing management infrastructure (assumption items 1.6) were observed.

However, some detail assumptions and constraints were not found during the case study analysis. In particular, we argue that a relationship manager - often our interview participant - was often responsible, but they seldom took on that responsibility explicitly. In addition, we did not observe many formal or specialized roles designed to monitor contract clauses; often this had to be managed by our interview participants as well. Similarly, we did not observe dedicated cost-benefit analyses in favor of knowledge transfer. In contrast, cost-benefit analyses for the whole IT sourcing initiative were often observed (10 of 13 cases; Figure 5-3, second column). Nevertheless, we found abundant evidence in favor of clearly defined schedules and resource assignments. While many firms did not employ the knowledge transfer planning explicitly (Figure 5-14, second column), one informant (UD.4.P) in particular made a strong and convincing case in favor of detailed knowledge transfer planning. Furthermore, we find that it is most beneficial to establish a communication plan in advance, because all cases ranked communication as an important factor in establishing trust (Figure 5-4, first column).

Among the assumptions for the methodological principles, we observed the trust factor (assumption item 2.1) in all 13 of our cases (Figure 5-2, second column); this factor has been highlighted several times during our literature review. We even found one informant (CA.1.P) who singled out professional acceptance as the most important dimension of trust. Therefore, trust in professional skills was found to matter more than benevolence. The study also allowed us to tell how trust was created, namely through working relationships (see the detailed discussion in section 5.1.2 on trust). Control (assumption item 2.6) turned out to be equally important as trust (Figure 5-2, first column), although it ranked much lower than trust in an expert opinion survey (Figure 5-8). However, while control and measurement were found in all IT sourcing initiatives, knowledge transfer was subject to these measurements in less than half of the cases. Nevertheless, these three successful knowledge transfer cases were explicitly controlling knowledge transfer. Therefore, we assume that knowledge transfer control, in addition to trust, is an important methodological principle even though its absolute importance remains unclear. Next, transparency (assumption item 2.4) is an oft-cited methodological principle (Figure 5-2, third column). Many cases (11 of 13) noted the importance of creating transparency (Figure 5-5, first column) with regard to knowledge transfer, including open communication of the future organization. Though only a minority supported the definition of future tasks for the knowledge source, a particularly successful IT sourcing initiative (UD.4) did this, and this initiative was so successful that both parties were able to discuss it in detail with the trade press. Nevertheless, some firms preferred to arrange the IT sourcing initiative themselves, in secrecy; one of these later failed. Since failure to communicate properly results in IT sourcing and knowledge transfer failure, but communicating directly indicates IT sourcing success we conclude that open communication of goals and other IT sourcing aspects, including knowledge transfer, benefits the IT sourcing knowledge transfer success. Therefore, setting and communicating very specific goals, future organization, and expected career options after the knowledge transfer and the larger IT sourcing initiative should be part of any IT sourcing knowledge transfer method. Two of the literature-based assumptions - structure (assumption item 2.5) and participatory work (assumption item 2.3) - had the same rank based on our case data (Figure 5-2, second and third column from left). While structure was a coded by one single code and was supported by a clear majority of our interview partners (10 of 13), participatory work was coded by several codes and suggests two conclusions. First, most cases supported the power of a shared feeling of jointly working towards the same goal. At the same time, the respondents also wanted clear-cut responsibilities divided between the IT sourcing contract parties (new observation) (Figure 5-6, second column). The latter finding is in contrast to the results obtained during our literature review, which indicated open, shared-responsibility contracts for a trust-dependent activity such as knowledge transfer. In short, shared goals are good, but they need to be combined with a clear hand-over of responsibility between the parties. Finally, motivation (assumption item 2.2), the methodological principle falling in last place (Figure 5-2, first from left) is also the most complex. While all major incentive schemas are supported by our case data, financial incentives were used slightly more often than non-financial incentives (nine out of 10 vs. eight of 10, respectively). Nevertheless, in several cases, informants reported that immaterial motivators such as new career options were much more effective than financial incentives with regard to knowledge transfer stimulation, particularly for employees transferred as part of the IT sourcing initiative. One provider informant described a best practice of using all four basic motivation types (SK.3.P – see section 5.1.2 for details). Therefore, we find that motivating employees to take part in a knowledge transfer initiative is in fact an important part of the process.

The procedure model assumptions could only be observed partially. While synchronization with the IT sourcing life cycle and the knowledge transfer phases were observed, relationships with a knowledge management framework (assumption items 3.1 and 3.2) were missing (new observation). Some firms chose to start knowledge transfer activities as early as during the architecture phase (assumption item 3.3), specifically during the design and selection process (Figure 5-9). Therefore, synchronization in the architecture phase (assumption item 3.4) is warranted. More specifically, according to the description of the IT sourcing design step and the selection process in our literature review (Cullen et al. 2006), synchronizations seems best to happen before and after the design step, and again before and after the selection process. In particular the knowledge identification activity should be performed in one of these two IT sourcing steps, because it often relates to the due diligence process (compare Figure 5-14 and following text). Due diligence is a highly recommended part of the selection process. In addition, the same IT sourcing selection process should entail the knowledge transfer planning activity (compare Figure 5-14 and following text), since at least one informant (UD.4.P) mentioned the resource plan to be part of the IT sourcing contract, and therefore the IT sourcing planning and the IT sourcing demands (incl. knowledge transfer demands) must be specified before entering the IT sourcing negotiation process. Once the IT sourcing negotiations conclude, the knowledge transfer plan may or may not be adapted (assumption item 3.5) and then executed through self-study and tandem activities, as well as either of the two reflection activities (compare Figure 5-14 and following text). This progress is a special case of the activities outlined in our literature review (assumption item 3.6). Specifically the knowledge transfer initiation activity is split into two separate activities (knowledge identification and knowledge transfer planning) – (specializing observation). Similarly, the knowledge transfer integration activity is replaced by two activities (project and ad-hoc reflection). Given the demand for clear responsibilities (see previous paragraph), we argue that with the end of the IT sourcing transition process, all knowledge transfers should be completed. Some reflection activities may continue to be performed within the IT sourcing manage process, but these should be planned separately. Therefore, a final synchronization between knowledge transfer and IT sourcing activities may be reasonable at the end of the IT sourcing transition process (assumption item 3.7). Finally, we did not find any procedure where the knowledge transfer management was handed over to a knowledge management organization (assumption item 3.8). Although the knowledge management relationship of knowledge transfers in IT sourcing relationship had been assumed, we did not observe any such relationship (new observation). This may be because we did not observe the knowledge management infrastructure because of our focus on knowledge transfer and IT sourcing. However, we did observe that general organizational knowledge management exists independent of knowledge transfer in IT sourcing initiatives.

Our case study data clearly supports four roles for managing the knowledge transfer initiative (Figure 5-12, first four columns): knowledge source (assumption item 4.1), knowledge recipient (assumption item 4.2), supervisor of knowledge recipient (a new observation), and a knowledge manager (assumption item 4.5). In addition, the role of a steering committee and a role managing the knowledge transfer (assumption item 4.3) were observed, but less frequently than the previous four roles (Figure 5-12, fifth and sixth columns). Program management (assumption item 4.4) was found less often in our case study. The only case in which we observed knowledge transfer program management was in one of the largest contracts (new observation). Finally, we found that knowledge transfer is managed primarily by the knowledge-receiving organization, even though the knowledge source organization may have initiated the knowledge transfer.

Regarding the information model, we were unable to find evidence for a skills profile of the knowledge receiver (assumption item 5.1), a documented knowledge-sharing policy (assumption item 5.4), or a list of knowledge-sharing stakeholders (assumption item 5.5) - (new observation). We did find support for the creation of a skills profile of the knowledge source (assumption item 5.2), and for the development of a competency inventory (assumption item 5.7) in the form of a skills catalog. However, only one case (SK.1) allowed us to study a future organization chart (assumption item 5.3) and an employee development plan (assumption item 5.6, assumption item 8.2). Moreover, many cases explained how they developed such documents, which leads us to conclude that these documents are highly relevant for successful knowledge transfer. In addition, the documentation focus observed here (Figure 5-13, first column) quite strongly supports the assumption for documentation (assumption item 5.8). Finally, we did observe some successful knowledge transfers that reached agreement regarding knowledge transfer activities, but in contrast to our literature review (assumption item 5.9), these agreements were rather detailed and formal. Therefore we cannot yet conclude whether the actual knowledge transfer agreement should be more formal or informal.

Based on our cross-case analysis we reorganized the activities proposed by the phase model of Szulanski (Szulanski 1999). First, the initiation phase (assumption item 6.1) was split into a knowledge identification activity and a knowledge transfer planning activity (specializing observation). Based on our findings this shows in a frequent skill catalog preparation in the knowledge identification activity (Figure 5-14 first column), and a relatively less frequent observed resource planning (Figure 5-14, second column). Furthermore, the rather general implementation phase (assumption item 6.2) was seen to become an activity of document collection and document creation by the knowledge recipient (Figure 5-13, first and fourth column). Since this activity was required to be executed by the knowledge receiver by one informant (UD.4), it is therefore more appropriately named self-study activity (Figure 5-14, third column). The subsequent ramp-up phase (assumption item 6.3) was also specialized and named tandem (Figure 5-14 fourth column). Rather than the original general phase, the tandem activity involves two people working towards a shared goal (specializing observation). The activity regulates the responsibility during the activity in detail, thereby fulfilling the assumption that some kind of participatory methodological principle is helpful. Performance is evaluated against performance targets defined earlier in the method as previously described (see the paragraph above on the methodological principles). Finally, the integration phase (assumption item 6.4) was again split into two more detailed activities (specializing observation): project reflection (Figure 5-14, second column from right) and ad-hoc reflection (Figure 5-14, first column from right). Both activities serve to allow the knowledge receiver to distribute and deepen his or her knowledge, but they occur at different times in the process. The project reflection is executed after a whole project, and the ad-hoc reflection – a collection of techniques similar to the after-action review used by the US Army – is usually used right after a specific task has been accomplished. Both techniques, however, were mentioned only rather infrequently (Figure 5-14, two right most column). Therefore, we cannot decide with any certainty whether these activities are important for a successful knowledge transfer.

The most frequently mentioned technique was documentation (assumption items 7.4 and 8.1), followed by face-to-face knowledge transfers (assumption item 7.1; Figure 5-13). Third place in the ranking is shared by employee transfer (assumption item 7.2) and document storage in a database (assumption item 9.1) accessible through an intranet (assumption item 9.2). While question-answering techniques were used (assumption item 7.3), they were subsumed under face-to-face techniques. These findings, when expressed in terms of the knowledge creation process of Nonaka and Takeuchi (Nonaka and Takeuchi 1995), mean that each of the four knowledge creation steps has at least one top-ranked technique. In summary, we notice that externalization and internalization are mentioned by far more often with a greater variety of different techniques. Furthermore, we conclude that some firms choose to avoid complicated knowledge transfers from one individual to another and transferred the employees, implemented a new system or a combination of both. The high cost of implementing a new system is clearly an option only for very long-term IT sourcing solutions that can recover the up-front investment over time or through repeat business on the same system. Half of the long-term deals in our study (Figure 5-1) showed unsuccessful knowledge transfers. All of these method-specific findings are summarized in the following table (Figure 5-15).

Pre Conditions	**OS Process**	Select + Transition	Transition	Transition	Transition
	Procedure Model /KT Phase	Initiation	Implementation	Ramp-Up	Integration
	Activities	Knowledge identification Knowledge transfer planning	Self-study	Tandem	Project reflection Ad-hoc reflection
	Techniques	Survey Skill identification Skill inventory creation Resource planning	Document creation Capture and transfer Document collection	Face-to-face meetings Learning-by-doing Apprentices and mentor	Face-to-face meetings
	Documents	Skills catalog Resource plan	Documentation	Not observed	Review report
	Roles	Knowledge source Knowledge receiver supervisor	Knowledge receiver Knowledge receiver supervisor Knowledge source	Knowledge receiver Knowledge receiver supervisor Knowledge source	Knowledge receiver
	Tools	HR topology Knowledge map	Databases Web-bases access to data	Not observed	Not observed

Figure 5-15: Observed design options for constituent method elements

While many specific factors could be observed in our case study research, detailed relationships between individual activities and document content could not be observed. Although techniques can now be specified in more detail, a detailed, step-by-step execution plan is still lacking. Furthermore, the workload of each individual role is unknown, and it is possible that software automation may improve the efficiency of the whole method. These aspects remain to be determined during the pilot research, where we will be able to implement the method and learn how a firm implements the suggestions that we have derived from theory and practice up to this point.

In conclusion, we find that our interview respondents placed heavy emphasis on documentation and employee transfer - much more than reported by Chini (Chini 2004) in internal knowledge transfer within firms. We can only assume that the documentation focus is due to the higher transaction costs for knowledge transfer between firms than within firms. Therefore, firms try to establish a defined frame of reference in order to avoid unexpected situations that touch on responsibilities and services provided. Documentation is therefore an insurance policy for the vendor against unforeseen risks, with the service portfolio taken over by the knowledge-receiving organization. We also discovered that some small, rather business process oriented, clients do not wish to receive knowledge any longer, once the process enters the management step. Many questions remain unresolved: how specific roles interact, the exact content of documents, the relationship of documents to specific activities, details of a plan of execution, and a definition of results in terms of milestones. To shed light on these questions, we will now turn to an implementation scenario in the pilot research.

5.2 Piloting findings

This section will present the results of six pilot implementations of our knowledge transfer method for IT sourcing initiatives. All pilots were conducted with the same vendor (also referred to, in the context of the pilot research, as a knowledge source organization) and the same client (also referred to, in the context of the pilot research, as a knowledge receiver organization). In contrast to most of the case studies presented in the previous section, the pilots were conducted as part of a backsourcing initiative. The initiative relates to the application software development outsourcing of a core banking transaction system. The client is a large Swiss financial institution with assets under management of more than 43 billion CHF, growing 7.7% annually, and more than 2000 employees at the end of our research. The firm manages assets for approximately three million. clients. Most of the firm's revenue is derived from corporate banking, but the retail banking business provides important leverage for the client in defending its corporate banking business, in addition to a small profit. The vendor in turn became largely dependent on the client as the vendor's software development business had become more and more entangled with the client's IT department. The initial general contractor relationship became an outsourcing relationship because the client was not capable to take over the software maintenance. The vendor's renevue is estimated to be in the lower- to mid-double digit million CHF. With a fresh team, renewed confidence, and management support, the client decided to take back the outsourced software development. The vendor agreed to let the client take over the development work and, with the beginning of the backsourcing, started looking for additional sources of revenue for the time after the backsourcing completed. Revenue sources arising through project business with the client were explored at first, but later abandoned. Finally, the vendor decided to partner with a larger software development company to contribute their specialty core banking transaction knowledge to the larger firms software product portfolio.

During the pilot research we looked for evidence that improved effectiveness of knowledge transfer. In a slight adaption of our success criteria we looked at successful knowledge transfer and at successful method application or practices if executed would have resulted in successful knowledge transfer or method execution. To collect our data we talked with a total of 70 people over two phases spanning a total of 24 months (see Appendix H or the reference card at the back of the printed version of the thesis for an anonymized map of all informants). Our informants during the pilot research covered the complete hierarchy of the knowledge-receiver organization, starting with board members and extending to individual staff. The following account will refer to the opinions and contributions of these people as noted in our field notes and the documents produced during our observation. We chose such a wide set of informants, because we believe the perspectives of different individual roles within a firm's hierarchy are different regarding certain events. Some staff was more qualified in certain aspects of the knowledge transfer then others. Our pilot researched aimed to always capture the most relevant source for any given aspect being observed.

Since the field notes are not direct meeting transcripts, we usually cannot cite the individual informants, but we refer to a description of the meeting outcomes. As a result, the citation of the individual pilot in which we made a given observation receives much more emphasis. Therefore, in the following results description of our pilot research, we will try to cite exemplary pilots wherever this is possible. Pilots will be cited by phase and pilot number (see Figure 5-16 in the following section). Informants will be cited using a combination of letters and numbers and their role can be verified in the organizational chart in Appendix H (e.g., C2 refers to the knowledge receiving firms' division head instructing C8). In order to provide an overview of the pilot research the following section briefly describes the knowledge transfer method (incomplete and experimental at that time) employed in each of the pilot initiatives and their research-specific attributes.

5.2.1 Piloting intervention descriptions

The pilot research was conducted in two phases (compare the methods discussion in section 4.2). The first phase contained four pilots, while the second contained only two. In both phases the problem was diagnosed to be the lack of knowledge transfer between individual employees of a knowledge source and knowledge receiver firm engaged in an IT outsourcing relationship. During the first phase, most pilots were designed differently, since we were trying different approaches in collaboration with the field. Pilots in phase two were more similar in design.

		Phase One				Phase Two	
Pilot		Pilot one of phase one	Pilot two of phase one	Pilot three of phase one	Pilot four of phase one	Pilot one of phase two	Pilot two of phase two
Diagnose/problem		1:1 knowledge transfer from vendor to client				Same as in phase one	
Notes		Agent	Early start		Agent		Agent
Duration days (effective)		43 (79)	67 (76)	34(15)	7 (2)	45 (57)	160(66)
Workload FTE days		16	90	26	4	18	>100
Success							
	Planned pilot	Yes	Yes	Yes	Yes	Yes	Yes
	Aborted pilot	No	Yes	Yes	Yes	No	Yes
	According to plan*	Partially	No	No	No	Yes	Partially
	Knowledge transfer success	No	Yes	No	No	Yes	No
	Method success	Partially	No	No	No	Yes	Yes

* Pilot followed the proposed plan

Figure 5-16: Overview of the piloting interventions performed

The research organization was also different between pilots. Some pilots were run by field agents (notably pilot one of phase one at a later stage, pilot four of phase one, and pilot two of phase two), while others were managed by our research team directly (pilot one of phase one in the beginning, pilot three of phase one, and pilot one of phase two). In addition, in pilot two of phase one the knowledge transfer had already started when we began to support the initiative with our approach.

The overall cost in terms of invested full time equivalent (FTE) man-days varied from only a few days (pilot four of phase one) to more than 100 days (pilot two of phase two). The overall duration turned out to be longer than initially expected, depending on the amount of time and the number of employees assigned to a given pilot. The extreme case was pilot one of phase one where the knowledge source and receiver were constantly assigned on different projects during the pilot period. This led us to hand over the management of the pilot to the sponsor firm. We were hoping that this would provide an incentive to the responsible supervisor to allow the employees to spend more time on the knowledge transfer. This should have improved the results of the pilot (it did not).

In fact, most pilots were abandoned, resulting in fewer effective work days spent on a pilot then initially planned (pilot two of phase one, pilot three of phase one, pilot four of phase one and pilot two of phase two). pilot three of phase one was aborted because the designated knowledge receiver left the firm. Participants of pilot two of phase one cited that the knowledge transfer had already started and the provided support as part of the pilot was no longer helpful. pilot four of phase one was aborted during the execution of the power packs activity citing that the knowledge was already with the knowledge receiving firm. A decision to abort pilot two of phase two was taken once it became apparent, that the designated knowledge receiver was not suitable to receive the knowledge.

Despite elaborate planning (often taking a long time), including agreements on milestones and deliverables, in many cases the plan was not followed (pilot two of phase one, pilot three of phase one and pilot four of phase one) or only followed partially (pilot one of phase one and pilot two of phase two). While pilot two of phase two went according to plan until it was aborted, in pilot one of phase one we observed repeated delays and reluctance of supervisors and managers when we reported non-performing knowledge transfers to them. Thought the unfortunate pilot organization lead to only one pilot in which knowledge transfer and the method usage were found to be successful (pilot one of phase two), at least one second pilot (pilot two of phase two) was aborted because of the proposed methodology. Such an early abort, as field sourced told us, was recognized as a successful method application. A third pilot was partially successful (pilot one of phase one), since it allowed the knowledge receiver to produce documentation of knowledge previously accessible exclusively by the knowledge source firm.

5.2.1.1 Phase one pilot initiatives

To facilitate the understanding of what we discovered as part of the learning step in the action research process model we describe the action taking for each piloting intervention. The presented description is structured according to the constituent method elements already employed for the presentation of the case study findings and described in detail in chapter 2.1 on method construction.

5.2.1.1.1 Principles

During the first piloting phase we did not describe any explicit principles. However, we relied to a large extend on mutual trust between the knowledge receiving and the knowledge source organization for all piloting initiatives. We also encouraged participatory work during the first pilot and the third pilot in phase one. Furthermore, all pilots in phase one were structured in terms of a defined plan and defined work results. Therefore all pilots tested the, albeit implicit, employment of two principles: trust and structure. In addition, the first and third pilot also tested the application of the participatory work principle.

5.2.1.1.2 Procedure model

During the first piloting phase we specified a sequence of activities to be performed. The knowledge to be transferred was first identified, followed by planning the knowledge transfer. Afterwards the knowledge receivers were to begin working according to the knowledge transfer activities specified for each pilot initiative. We also described three roles during all of the first phase piloting initiatives – at first excluding the research team as a separate role during identification and planning. Therefore, the first piloting phase showed the employment of a simple procedure model. The information model was not yet described and did not integrate into the procedure model.

5.2.1.1.3 Information model

Since the first phase pilots were intended to test knowledge transfer method variants the information model was different for each pilot. However, some individual documents were the same for each pilot. The documents holding the identified knowledge, the knowledge catalog, is one document that was the same for all pilot initiative during the first phase. During the first piloting phase the knowledge was represented in a large social network graph[59]. The graph connected each knowledge receiver with any knowledge source employee that was asked any knowledge during a specific time frame. Each edge being drawn in the graph was directed toward the knowledge source employee and labeled with keywords describing the knowledge requested. Edges going from knowledge receiver firm employees to the knowledge source firm employees were colored in red, those going towards the knowledge receiving firm were colored green, and those within the respective organizations were each colored with yet different colors. While the individual format and level of detailed varied, every pilot during the first pilot phase produced some form of documentation.

Some documents were at least similar in a few pilots. During pilot one, two and three the same learning history activity was employed. Some form of learning history documents were produced in several of the pilots, but the format varied as different tools were used. Pilot two for example was asked to use a Microsoft Word document while pilot one and three were asked to use a web based platform (i.e., a weblog) to document learning histories. The same first three pilots of phase one employed the power packs knowledge transfer activity and in the process created a knowledge item specification. The content and creation responsibility for pilot one and two was assigned to the knowledge receiver and to the knowledge source during pilots three and four. The documents contained similar information. Each of these knowledge item specifications described the knowledge to be transferred in sufficient detail to differentiate the knowledge. Furthermore, a knowledge transfer profile and a database of knowledge per role was tested in all phase one pilots except for pilot two. These documents aimed to describe the reasons why a knowledge transfer was initiated, why a particular set of employees had been chosen, who influenced the decision, when to start and stop with the knowledge transfer and which reasons might have lead to a gap in knowledge. In addition, the documents were meant to describe which roles were involved and which level of knowledge regarding various knowledge items should be reached upon completion of the knowledge transfer.

5.2.1.1.4 Role model

A simple role model was employed during the first piloting phase. Besides the knowledge receiver and the knowledge source we specified a coaching role. During different knowledge transfer activities the coaching role had to assume many different tasks, such as leading interviews to elicit knowledge items, planning knowledge transfers and supporting knowledge source and knowledge receiver in the execution of activities and techniques.

[59] The social graph used was inspired in large parts by the social graph concepts proposed by Granovetter in 1973; Granovetter, M.S. 1973. The strength of weak ties. *American Journal of Sociology* **78**(6) 1360.

5.2.1.1.5 Activities and techniques

During the first piloting phase all pilots executed knowledge transfer identification and knowledge transfer planning activities. Pilots one, two and three used the power packs and learning history activities and techniques. However, only pilots one and two produced meaningful power packs in terms of documentation since pilot three was aborted prior to completing the power pack activity. Pilot four employed the knowledge asset activity, a variation of power packs that focuses on technical details rather than contextual information such as related experts and training documents. Part of the technical details should have been retrieved from historic records during the history data recovery activity.

Two interactive knowledge transfer activities were planned for in pilot one and three. Pilot one tested semi structured interviews, asking the knowledge receiver to formulate questions prior to meeting with the knowledge source. The meetings between knowledge source were tentatively planned in advance to provide general schedule of the activity. During the buddy support activity in pilot three the interaction was planned to be less structured and focused more intensely on the knowledge receiver and knowledge source working together towards a common goal. During pilot three the knowledge receiver would have engaged in a specific programming activity. The knowledge source would have observed and supported the knowledge receiver during that activity.

All of the knowledge transfer activities were at least initially lead by the research team during the first piloting phase. This was due to the experimental character of each pilot which could only be handed over to field agents (i.e., staff at the knowledge receiving firm) once they had sufficient understanding of the activities.

5.2.1.1.6 Tools

During the first piloting phase we asked the pilot participants to share any documents and information created as a result of the knowledge transfer activities. This included in many cases standard Microsoft Office files send by e-mail from one participant to the other. In addition, Microsoft Windows file shares were used to share information. In addition to these technical sharing tools we explicitly asked the phase one pilot participants to use as wiki, a web based information sharing software. The wiki contained knowledge identification, knowledge planning and knowledge activity results. The platform supported a search function and several proprietary editing functions and a dedicated access rights management system.

5.2.1.1.7 Relevant data sources

The data underlying the first piloting phase consists of four evaluation interviews (Appendix I), approximately 300 pages of field notes (Appendix J), one GroupSystems[60] workshop report (Appendix K), the first four of eight steering committee meeting slide decks (selected extracts in Appendix L), 30 interview transcripts of employees, one knowledge map in Microsoft Visio file format, software design documents of the sponsor firm, organizational charts and a business process description of the sponsoring firm, and IT sourcing contracts between the sponsoring firm and its vendor, as well as employee evaluations we were permitted to review or create.

5.2.1.2 Phase two pilot initiatives

In the first phase of the piloting research we relied on informal power point slides and general activity description often conveyed in person. Prior to the second piloting phase the experience from the first phase was documented in a series of reports (Voigt 2006a, b, c, d, e, f). The reports describe the knowledge transfer method at that time in fair detail. Therefore, the following account will highlight important changes from phase one to phase two rather than providing further detail on the methods mechanics.

5.2.1.2.1 Principles

In contrast to the first piloting phase, the second piloting phase extended the set of method principles. Since we observed many delays and underperforming pilots during the first phase we introduced controlling and motivational aspects into all pilots of the second piloting phase. In addition we tested whether more transparency regarding the overall knowledge transfer goals would improve the knowledge transfer outcome by introducing a transparency principle.

5.2.1.2.2 Procedure model

The generally more formalized reports on how exactly the knowledge transfer should be carried out allowed the second pilot phase to better integrate the procedure model with the information model. Furthermore, we were able to describe roles and responsibilities in more detail.

5.2.1.2.3 Information model

It proved difficult to collect all of the data for the employee knowledge per role and the knowledge transfer profile during phase one. Both, the knowledge transfer profile and employee knowledge profile per role were ever only partially completed. Sensitive personal and politically delicate information was often omitted. Therefore, the data that was found relevant and

[60] GroupSystems is a leading group decision-making software vendor. The software used was GroupSystems for Windows.

collectable was merged into one single document. We tested two variants of such a single document: a modified version of the knowledge item specification and an entirely new one, the knowledge transfer manifest[61]. Pilot one of the second phase tested the modified knowledge items specification which was enhanced by more detailed reasons for the knowledge transfer, start and end dates and important milestones. Pilot two tested a comprehensive knowledge transfer manifest including reasons for the knowledge transfer, the team structure, the choice of knowledge transfer activities, milestones and required deliverables and available budgets.

With regard to the documentation provided as part of the second piloting phase we defined the content creation responsibility more strictly. Only those pilots were the knowledge receiver was responsible for the document writing during the first piloting phase produced suitable documents. Therefore, during the second piloting phase all documentation was written by the designated knowledge receiver. Finally, since the learning histories were only very rarely used during the first piloting phase, we decided to test one dedicated learning history format in one of the two pilots while the other did not use any specific format.

5.2.1.2.4 Role model

We observed that the coach had to manage a great number of different tasks during the first piloting phase. To allow the coach to spend more time to support the knowledge transfer receiver and the knowledge transfer source more specialized roles were introduced. A supervisor role was introduced to deal with any employee related issues such as proper staffing, identification of suitable knowledge transfer participants and employee motivation. While pilot one of the second phase only employed the supervisor role, the second pilot introduced a dedicated knowledge transfer project manager to handle resources and to oversee the whole pilot, a knowledge transfer sponsor to provide the required resources and a dedicated controlling role to observe proper resource use and knowledge transfer progress.

5.2.1.2.5 Activities and techniques

The knowledge identification and knowledge transfer planning activities were also carried out during the second piloting phase. However, since the first piloting phase required too many resources to complete these two activities a different approach was tested. The knowledge identification was delegated to supervisors of the knowledge receiver and the knowledge source firm. Once the knowledge was identified it was prioritized according to strategic and operating

[61] In fact a modified version of the knowledge transfer profile was proposed by our reports; it was not tested because all pilot participants in the second phase rejection such a profile.

priorities. Afterwards, the knowledge transfer manifest was employed to plan the knowledge transfer for the highest priority knowledge.

Since buddy support, learning histories and knowledge asset activities were well received during the first piloting phase these activities were again employed during the second phase. Albeit in some cases they were used without originally planning their use. In addition, three news activities were tested. The war stories and self-study activities were chosen in pilot two because of the strict requirement to ask the knowledge receiver to produce the documentation. The same reason lead us to test the self-study activity for pilot two. The success evaluation activity became required based on the new control principle during the second piloting phase.

Finally, we noted that much more knowledge transfers were managed by agents of the knowledge receiving organization than during the first piloting phase. This may be because of the more formalized knowledge transfer reports to educate the involved employees.

5.2.1.2.6 Tools

The wiki software tested in the first piloting phase proved less successful. Pilot participants cited a need for familiar edit tools, integrated security, not just wiki but global search and a familiar structure as the main reasons to avoid the wiki usage. Therefore, we employed integrated document sharing and collaboration software provided by Microsoft. The systems usability and structure was more familiar, provided an integrated security system and allowed to easily share and discover the files used during the knowledge transfer. The new software also allowed the pilot participants to search more easily through existing documents without previously loading everything into wiki software. This fact lowered the up-front investment in time spend to understand the software before receiving a perceivable benefit.

5.2.1.2.7 Relevant data sources

The data for the second piloting phase consisted of the same 300 pages of field notes (Appendix J), the last four of eight steering committee meeting slide decks, one knowledge item catalog in Microsoft Excel format, as well as the same contracts, business process descriptions, and software designs as in phase one. Some of the information (the information not referenced to an appendix entry) is confidential and cannot be provided as an integral element of this publication. However, we can always facilitate interested researchers' access to these documents through our contacts with the sponsoring firm.

After the table overleaf summarizes the different pilot configurations with regard to each method element component being tested, the next section will start the presentation of our observations. Each section will present our findings taken from the learning step of action research following the same structure of constituent method elements employed during the case study result presentation. The results of the evaluation action research step will be presented in chapter 7 , which describes the deployment and evaluation.

		Phase One				Phase Two	
Pilot		Pilot one of phase one	Pilot two of phase one	Pilot 3 of phase one	pilot 4 of phase one	Pilot one of phase two	Pilot two of phase two
Principles							
	Trust	x	x	x	x	x	x
	Motivation					x	x
	Participatory	x		x		x	x
	Transparency						x
	Control					x	x
	Structure	x	x	x	x	x	x
Procedure model							
	No procedure model						
	Activity order						
	Activity order and roles	x					
	Activity order roles and documents					x	
Information model/documents							
	Knowledge catalog	x				x	
	Employee knowledge per role	x		x	x		
	Knowledge transfer profile	x		x	x		
	Knowledge item specification	x	x	x		x	
	Knowledge transfer manifest						x
	Documentation+	x	x	x	x	x	x
	Learning diary entry		x	x			x
Role model							
	Knowledge source	x	x	x	x	x	x
	Knowledge receiver	x	x	x	x	x	x
	Coach	x	x	x	x	x	x
	Supervisor knowledge source						
	Supervisor knowledge receiver					x!	x
	Project manager						x
	Sponsor						x
	Controlling						x
Activities/techniques*#							
	Knowledge identification	R				R	
	Knowledge transfer planning	R	R	R	R	R	A
	Power packs	R, A	R	R			
	Semi-structured interviews	R					
	Learning history	R, A	R	R		R	A
	History data recovery				R, A		
	Knowledge assets				R, A	(AR)	
	War stories					AR	
	Buddy support (tandem)			R		(A)	A
	Self study					AR	A
	Success evaluation					AR	A
Tools							
	Blog	x	x	x			x
	Wiki	x	x	x			
	Microsoft Word		x		x	x	x
	Microsoft Excel				x		
	Microsoft Visio	x					
	Microsoft Windows file share	x				x	

+ Various forms of documentation were proposed, ranging from network diagrams to process charts and program design logic.
! We didn't specify that role, but we instructed the supervisor to take responsibility.
*During the pilots we mixed techniques and activities, since we were not certain which techniques required more instructions, therefore becoming activities, and which were sufficiently clear without further instructions.
The letter "R" identifies research team intervention, the letter "A" identifies the sponsor firm's agent intervention, "AR" specifies joint intervention, "A, R" or "R, A" defines the sequence of interventions by each party.
() Not planned, but adopted by the pilot participants later in the pilot initiative

Figure 5-17: Pilot initiatives summary

5.2.2 Results regarding method principles

Our most prominent discovery was that the client apparently lacked proper control instruments for the knowledge transfer. For instance, some knowledge transfers took place before our pilot research started, but the client allowed these employees to later leave the company or the team (P2, C48). In addition, knowledge transfer evaluation meetings defined in the contract between both parties were not conducted, and the knowledge-receiving employees of the client were not asked to document their knowledge (P2). The lack of knowledge retention by the client frustrated the vendor employees (P9 and others), because, as a result, they were repeatedly asked to transfer knowledge again – and blamed for not doing so (P2, P9). These organizational issues, in addition to an unspecified knowledge transfer goal, resulted eventually in a knowledge transfer initiative whose progress was not measured, controlled, structured, or planned. We also found great disagreement regarding who was responsible for which area of software development among the employees for both firms. The vendor employees had an understanding among themselves which areas they would work on, but they occasionally worked in other areas if their development tasks required it (P5). However, the same understanding did not transfer to the client employees taking over the development tasks. The client had to specifically match employees to certain development areas, because each employee could only take up so much new knowledge (ME1). Often, the client had to divide responsibilities between one vendor employee and many different individuals on his or her own staff. Since the client and the vendor initially did not agree which knowledge and related responsibilities to transfer to one or more client employees, or which vendor employee to transfer it from, measuring progress of the knowledge transfer was almost impossible. Therefore, managers wanted to find a way to control the knowledge transfer based on measurable goals (C2, ME2). We provided such goals through milestones in a structured and transparent knowledge transfer process. The two pilots in phase two (pilot one of phase two, pilot two of phase two) were both controlled thoroughly, and both pilots showed the method to be successful.

We also discovered that the vendor did not place sufficient trust in the employees picked by the client to aquire the knowledge (C32, C33). This was particularly problematic because the client had only recently stopped consulting the vendor on new hiring decisions and therefore added uncertainty regarding the skills of newly hired knowledge receivers (P2). On the other hand, the vendor complained that he was not trusted to actively participate in the knowledge transfer. Client employees supported such a perception; it was often mentioned by client employees that the vendor was expected to behave opportunistically to retain the business (C32, C33, C31, C34, C29, C35). This expectation repelled some client employees, and several explained that they did not want to work with the vendor (C33). Some employees even refused to communicate with certain employees of the vendor. Such a client behavior made knowledge transfer difficult. Some vendor staff was certainly very dominant and difficult to work with. These (often senior) employees were used to not being questioned and to feeling free to make what choices they liked in their development work. In contrast, the client employees were much less free in their decision-making. They were often required to verify their decisions with more senior developers. In turn, the senior developers – often vendor employees (ten of 16) - did not want to be disturbed by seemingly trivial issues and, while responding to questions, they did respond to trivial questions reluctantly (C34). This difficult question-answering process further deteriorated the trust level among employees of the two firms. Specifically, the relationship between the two groups was worse in team A than in team B. While the client thought the vendor would exploit his dependence, the vender thought the client employees were not sufficiently skilled to perform the required work (P9, P2). Because of the importance of trust, we addressed several aspects of it during our pilot implementations. For example, all pilots required that the knowledge receiver produce a piece of documentation (sometimes even computer code) on his or her own, allowing him or her to show that he or she is capable of producing relevant work products. However, trust alone did not seem to lead to more successful method application or knowledge transfer success.

The whole backsourcing initiative was not perceived by the employees to be very transparent. First of all, the backsourcing initiative was communicated ambiguously. Some employees thought that the client didn't really plan a backsourcing (P5, P9), others thought the backsourcing would not be complete (ME1, C10), and still others were convinced that backsourcing was the only way (C2, C1, C3, C29, C33). The fact that the vendor started to develop new revenue streams – essentially building a future organization for his or her employees - was only communicated through informal channels, and the financial goals and schedules of the client in regard to the backsourcing were not communicated at all. These difficulties made it almost impossible to define the knowledge relevant for the knowledge transfer. Hence, employees complained about the lack of defined knowledge transfer targets (ME1).

To provide some measurable targets, we established a structured knowledge transfer process. The process was structured to provide milestones as well as defined knowledge to be transferred. While this structured knowledge transfer was not embraced by all employees (P2), management officers were grateful to be able to measure their management commitment more directly and to target specific knowledge areas (ME1, ME2, C2, P1). The process allowed us to align roles with the relevant knowledge transfer activities, thereby establishing that managers were responsible for a given transfer. In addition, we created a chain of documents necessary to completing certain steps in the process. Such a structured approach was chosen in all of our pilot projects, but, as we showed earlier with the trust principle, structure alone did not help execute the knowledge transfer successfully. Furthermore, we observed that those pilots where we were able to at least partially conduct the pilot according to the original plan were much more likely to become successful knowledge transfer initiatives (pilot one of phase two). Indeed, all the pilots not conducted according to plan were aborted (see Figure 5-16). Consider also that the pilots working at least partially according to a plan showed a successful method application (pilot one of phase two, pilot two of phase two) in two of three cases and that the pilots deviating from the initial plan (pilot two of phase one, pilot three of phase one, pilot four of phase one) showed no successful method usage (also see Figure 5-16).

The vendor employees were used to collaborating very closely among themselves. Most vendor employees were very senior software developers and had expert understanding of the software system. Very few formal processes were established among them. Since they knew the software from years of development experience, documentation was reduced to a minimum – barely enough to introduce a highly skilled programmer (C31, C32). In consequence the knowledge was largely tacit, residing with the individual vendor employee. Therefore, a participatory knowledge transfer style was dominant with the vendor, and the client employees adopted the dominant work style. However, because of the difficult trust situation outlined before, client and vendor employee interaction had to be carefully managed to avoid misunderstandings and conflicts (pilot one of phase one, pilot four of phase one). During our pilot research we were only once able to practically conduct such a participatory knowledge transfer in the second phase (pilot two of phase two). The first attempt failed, because the knowledge receiver left the client company (pilot three of phase one).

The incentives and motivations of vendor and client employees were designed differently. While the vendor employees worked as part of a profit center, the client employees worked as part of a cost center organization. This difference resulted in drastically different financial incentives (ME1, C1, P2). The vendor employees received a considerable bonus in addition to a higher wage and overtime pay; the client employees, on the other hand, received only a negligible bonus (C29, C33), and their overtime was not only limited to a few hours but usually compensated by vacations rather than money (C8, C2). While the union contract of the client permitted higher bonus payments, these options were not explored by the specific division we observed. In addition to the different wage structure, one of the motivators mentioned during our case research was observed to be missing: career perspectives. Neither client nor vendor employees had a clear career development perspective for the time after the knowledge transfer. While the vendor was developing a future organization, we did not find a way to convince the vendor management to motivate the knowledge sources through specific future career perspectives, except in one case in which an employee left for retirement (pilot one of phase two). The client followed the motivation principle in one successful case and negatively motivated the knowledge receiver by demanding a successful knowledge transfer in return for a long-term labor contract (pilot two of phase two). However, with the knowledge source unsure about his future career options, the motivation was asymmetrical, and it failed. As a result, we find that knowledge transfers need to be motivated in equal terms and symmetrical; i.e., both parties receive a benefit or penalty.

In summary, while the lack of trust and structure was clearly the most important issue we were able to observe in all pilots, participatory work and control were likewise demanded. But these could not entirely be implemented in all pilots. Finally, transparent communication of the initiative and dedicated incentives to motivate knowledge acquisition were only possible in the last pilot of our study. We conclude this section by stating that we did not find any evidence in our pilot research that any of the method principles outlined by the literature or case study research are impractical or not required. In fact, we observed that the more of the principles were employed, the more successful the knowledge transfer method was. Trust and control did not alone suffice for achieving a successful method application. The following section will turn to the observed order of activities, resulting documents and the involved roles.

5.2.3 Results regarding procedure, information model and roles

For the first pilot phase, in order to manage the knowledge transfer, we chose the knowledge transfer process proposed by Szulanski (Szulanski 1999). Based on feedback from the field, especially from project managers (PL1, PL2) and our method engineer (ME2), we revised the process to better match the IT sourcing context. We modified the second and third phase of the four process model. The resulting phases are (names in brackets indicate the original name according to the literature): Initiation (initiation), preparation (implementation), transition (ramp-up) and integration (integration). In the following text we will first explain the order of the activities and then continue to describe which documents were useful and who finally had responsibility for producing the documents.

Since certain activities had to be performed before others, we grouped activities into stages: a planning stage and an implementation stage. The planning stage activities all had to be executed one by one before the implementation stage, while the implementation stage activities could be performed in parallel. Figure 5-18 illustrates the stages along the knowledge transfer process phases. While some pilots chose different activities, all pilots followed the general procedure model and carried out the relevant activities in the same order. Finally, the whole knowledge transfer initiative had to be coordinated with the internal documentation and knowledge management organization. The client firm had been developing – through not yet enforcing – specific software systems and documentation policies which employees were asked to adhere to for every product version. According to a source familiar with the new documentation and knowledge distribution policy explained (C49), each team had been assigned a role in the management of documentation creation and updating. The process required that every work product version (i.e., software release) was accompanied by documentation. Therefore, if the documentation policy was enforced, the knowledge transfer process would be synchronized once after the preparation phase and again for each knowledge application that changed the work product during the transition and integration phases (compare Appendix M).

The knowledge transfer began with two activities in the planning stage which were executed by all pilots. First, knowledge identification was performed once for each pilot phase, resulting in a knowledge catalog. Second, all pilot knowledge transfers were planned in advance, resulting in a knowledge transfer plan. In the first pilot phase, the planning stage was process-oriented and involved many detailed steps with a lot of involved roles. The complexity of the process made it difficult to implement in practice. In addition, during pilot four of phase one, the complexity of the process made us focus so much on process details that the outcome was not verified sufficiently. As a result, a knowledge item selected for knowledge transfer in fact did not even qualify for it, requiring, rather, knowledge development. Based on these experiences we chose a document- and milestone-driven approach in the second pilot phase.

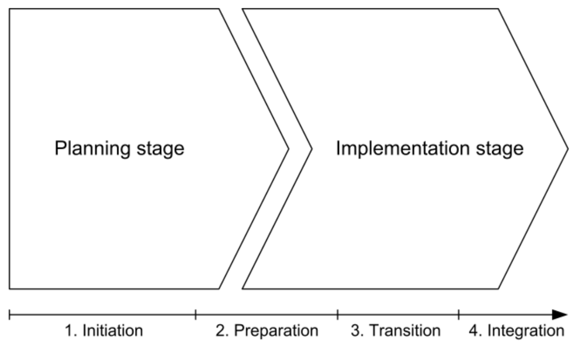

Figure 5-18: Procedure model process applied in pilot research

Once the planning stage completed the initiation phase, the implementation stage began with the preparation phase. The preparation phase was characterized by heavy emphasis on documentation. In the first pilot phase we conducted a series of literature-based, practitioner-selected (PL1) activities like preparation of knowledge assets, power packs and history data recovery. However, the field did not respond well to these generic activities. For instance, we were told in pilot two that more guidance regarding the level of detail for documentation had to be provided. In addition, the knowledge receivers demanded more freedom to discover the knowledge for themselves and to apply the knowledge rather quickly (pilot two of phase one). This led us to reduce the documentation focus while retaining the critical structural aspects for the second pilot phase. In addition, the second phase allowed the knowledge receiver to work more independently and to apply his or her knowledge faster. As a result of the demand for faster knowledge usage, the preparation and transition phases were allowed to blend into each other. Partial work related to the transferred knowledge was encouraged already before the final preparation milestone was passed in terms of knowledge source-reviewed documentation.

The transition phase therefore started rather early. In pilot two of phase one and pilot four of phase one, we discovered that small projects helped the knowledge receiver to internalize the knowledge and also helped the knowledge source to develop trust in the knowledge receivers' skills. Additionally, the experiences from these "trust-building" projects could be directly included in the final documentation due for the final milestone of the preparation phase. We were able to observe only the finalization of the transition phase in pilot one of phase two. The final milestone of the transition was marked by a meeting in which the quality of the documentation was discussed. Additionally, the knowledge receiver had to answer transfer questions[62] regarding the knowledge area in question, and the work performance during the transition phase was discussed. The phase was only concluded once the knowledge receiver supervisor – with assistance from the knowledge source – was convinced that the knowledge receiver was able to perform the relevant tasks independently (pilot one of phase two). Usually, the relevant work during the transition phase was assessed in terms of how many times the knowledge receiver had to go back to the knowledge source with questions and how high the quality of the work results had been (e.g., number of programming errors). Even though the second pilot in the second phase ultimately failed, the field commented that the failure was perceived to be a success of the method (C2). As a result of applying the method, the inadequately recruited employee was noticed early on. Since the method asked to closely monitor his work performance during the transition phase, the deficiencies could be established quickly. Earlier new-hire processes put the employees to work in the designated knowledge area in a

[62] Transfer questions are questions, which relate to a certain subject of interest but require that the knowledge is applied in a different context than that presented to the knowledge receiver. According to personal conversation with Josie Taylor, an education expert with the Open University, transfer question testing is one of the most powerful testing techniques.

much less rigorous way. By allowing more time to pass between hiring an employee and testing him in the work process, both employee and firm had trouble establishing if a given new hire was able to perform the required work and to pick up the relevant knowledge in due time (pilot two of phase two).

Finally, the integration phase was executed in pilot one of phase one and pilot one of phase two. Both teams instructed their knowledge receiver to share the created documents at an electronic storage location accessible to all team members. These electronic platforms were only accessible to team members, though, and were structured individually. The reduced accessibility and individual structure made it hard for external employees to benefit from the available knowledge (C28). More details regarding electronic tools are described in the following section.

Documents leading the knowledge transfer process became important milestone deliveries. As described earlier, excessively process-centric approaches turned out to be impractical knowledge transfer guidance (pilot one of phase one and pilot four of phase one). The field preferred document-focused approaches (ME1, P3). Therefore, we designed the process in such a way that documents were the delivery for a given milestone rather than reaching a given process step. As a result, we developed a series of documents for each of the knowledge transfer activities in the knowledge transfer phases. Figure 5-19 lists the various document names and links them to the respective activities (compare Appendix N to Appendix W for templates of these documents). Following the table we will present the purpose, content and source of each document.

Document name	Activity	Knowledge transfer phase	Description , purpose and responsible party
Check list for pre-conditions	-	Initiation	Mandatory, verifies that the organizational environment is prepared for a knowledge transfer; knowledge transfer project manager
Knowledge item catalog	Knowledge identification	Initiation	Mandatory, list of transfer-relevant knowledge items; knowledge transfer project manager and supervisor
Knowledge transfer program	Knowledge transfer planning	Initiation	Optional, list of knowledge transfer participants and status of each knowledge transfer; knowledge transfer project manager
Roles	Knowledge transfer planning	Initiation	Optional, organizational chart for communication purpose of knowledge transfer responsibilities; knowledge transfer project manager
Knowledge transfer risk analysis	Knowledge transfer planning	Initiation, and following	Optional, defines the problems that may exist with any given knowledge transfer initiative (i.e., lack of skill on part of the knowledge receiver); knowledge transfer project manager and supervisor
Knowledge item specification	Knowledge transfer planning	Initiation, preparation	Mandatory, lists the relevant document of a given knowledge transfer; knowledge transfer project manager and supervisor
Knowledge transfer manifest	Knowledge transfer planning	Initiation, and following	Mandatory, description of responsibilities, escalation procedures, goals, budgets and deadlines for a knowledge transfer; knowledge transfer project manager
Design	Self study	Preparation	Mandatory, connects the knowledge transfer to the firm's documentation policy; knowledge receiver
Review	Knowledge identification, Knowledge transfer planning, self study, tandem	Initiation, Preparation, Transition	Mandatory, connects the knowledge transfer to the firm's documentation policy; knowledge source supervisor and knowledge transfer project manager
Template ad-hoc reflection	Ad-hoc reflection	Integration	Mandatory, records the lessons learned in an ad-hoc reflection meeting; knowledge receiver and knowledge transfer project manager

Figure 5-19: Document list developed during the pilot research

We learned in the first piloting phase that, before a knowledge transfer initiative can be executed in an IT sourcing setting, certain organizational criteria have to be ensured. If these criteria are not fulfilled, a knowledge transfer may be less likely to complete successfully. In order to avoid unnecessary efforts, we gathered all our experiences regarding pre-conditions of knowledge transfers in a list and allowed our method engineer to remove redundant or impractical items. The final list contains nine criteria which have to be assigned specific values. The task of collecting the data for the checklist rests with either the IT sourcing project manager or a delegated assistant and should be initiated by the knowledge transfer sponsor. Whenever the checklist encounters open issues, the knowledge transfer sponsor needs to decide whether the knowledge transfer should go ahead anyhow or the issues need to be solved.

The knowledge item catalog proved to be an important governance instrument (C2, C1). While the first draft designs were graphical knowledge representations only, we quickly developed a more practical list-type specification of knowledge in the context of an IT sourcing knowledge transfer. We designed a data model of an identifiable knowledge item. Apart from a link to a higher-ranking knowledge area, the knowledge item included references to information resources (e.g., documents) relevant to a knowledge item, roles associated with tasks that required the specified knowledge and two prioritization attributes: operational urgency and strategic importance. The information resources were linked to the knowledge item because the receiving organization told us (C32, C33) it did not know which documents were available. In addition, the knowledge source organization complained that information resources provided to the knowledge-receiving organization were not studied by the knowledge-receiving employees (P3, P9). Furthermore, the knowledge source organization management claimed that much knowledge was specific to certain roles. Similarly, the knowledge receiving organization identified relevant tasks it wanted to perform; therefore, the knowledge items were linked to both roles and tasks. This made it possible to link to tacit knowledge sources through roles, while the information resources linked to explicit knowledge sources. In addition, the knowledge items' importance and urgency were placed into different attributes. This separation resulted from the need to transparently show different priorities on different organizational levels. Team supervisors, for instance, complained that management attention was overly strategy-focused (C10, ME1) and disregarded operational issues (i.e., urgency). Management and executive staff, in contrast, complained that knowledge transfer was either not happening or not in line with organizational development targets (strategic importance) (C2, C4, C1, C3).

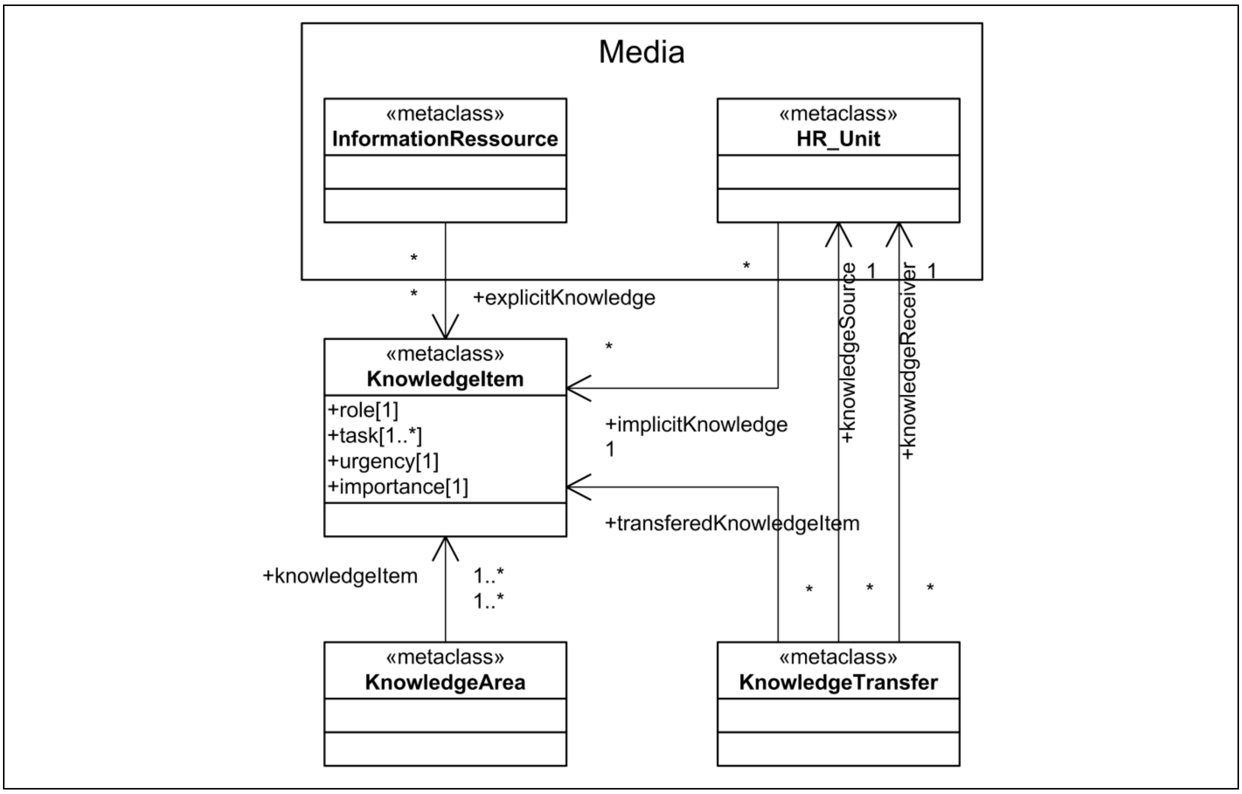

Figure 5-20: Knowledge item specification as UML meta model

At the outset of our pilot research, a knowledge item contained many more mandatory attributes. However, these were subsequently removed or demoted to optional attributes. We reduced the attribute set because the discussion with our method engineer showed that too many attributes complicated the knowledge identification activity to such a degree that it became too time-consuming in practice (a fact we observed during both knowledge-identification activities). Furthermore, we noticed, that it was more difficult for the teams of the knowledge-receiving organization to describe the knowledge items than it was for the teams of the knowledge source organization (ME1, C10, C34, pilot one of phase one, pilot four of phase one, pilot one of phase two). Therefore, we tasked the knowledge receiving teams with the creation of the knowledge item catalog, while the detailed knowledge item specification was provided by the knowledge source firm. Such a separation of tasks made it easier for the receiving organization. Even though it may at first be hard for the knowledge-receiving organization to properly express the knowledge they need (ME1), it is essential that the organization requesting the knowledge define its requirements (P3, P2). Some team leaders first needed to spend some time understanding the problem domain themselves (ME1). As a result, the knowledge identification took from a few weeks to several months. Given this complexity and our experience during both pilot phases, we, as knowledge identification specialists, had to assist the knowledge identification. During our pilot research, the research team assumed the responsibility for producing the knowledge catalog (since it was an essential document to advance the research). However, this resulted in a tedious information collection process. In practice, team supervisors should have responsibility for collecting this information from the team, since the process relates to employee development responsibilities (C2, ME2, C29, C10), which, by common agreement, are the concern of team supervisors. For the purpose of defining clear roles, we referred to the role responsible for the knowledge transfer as the knowledge transfer project manager.

In addition, the knowledge item catalog was complemented with what later became known as the knowledge transfer program. This document helped to track the various knowledge transfers. The document contained more than one of the identified knowledge items and the assigned knowledge source and receiver pair as well as their knowledge transfer progress. The program file was the primary instrument of a knowledge transfer program manager. Both the program manager and the knowledge transfer program file were suggested by the method engineer (ME2), who observed that we as researchers were using a similar document to track the various pilots. Of additional administrative assistance was the role template. This document was intended to assist the knowledge transfer program manager in organizing the various roles, reporting structures and responsibilities in a more complex knowledge transfer scenario. Moreover, as knowledge transfers involve people with different personal characteristics and potentially conflicting goals, the optional knowledge transfer risk analysis document was created to enable a program manager or a knowledge transfer project manager to assess various factors with regard to the knowledge transfer initiatives. This risk analysis is the outcome of feedback from our method engineer after a much more complex employee profiling tool turned out to be too cumbersome and impractical during the first piloting phase (C10, pilot two of phase one, pilot one of phase two).

To more closely define the knowledge to transfer, the knowledge item specification document asked the knowledge source – not the receiver in line with the earlier argument regarding the knowledge item catalog – to list all relevant information sources and references regarding the knowledge item. The document also asked the knowledge source to estimate how long the knowledge transfer might take (PL1) and to relate other knowledge items to the one to be transferred. The importance of a well-specified knowledge item became apparent when we had to abort pilot four of phase one. This pilot tried to transfer knowledge that was already with the client but had not been developed for the particular context. In addition, the knowledge from the vendor was not applicable at the client. The lack of proper knowledge item specification was identified as the reason pilot four of phase one failed (ME1).

The initiation phase was completed by creating the knowledge transfer manifest. This was the main knowledge transfer planning document. It connected the knowledge transfer checklist, knowledge item catalog, knowledge item specification and the knowledge transfer risk analysis with budgetary, scheduling and knowledge transfer targets. While the document was non-binding, it was signed by the knowledge receiver and knowledge source to declare that they were committed to the knowledge transfer as described in the document (pilot two of phase two). The relevant data for the knowledge transfer manifest were either provided by the knowledge transfer project manager directly or collected by him.

In the knowledge transfer manifest, we asked knowledge transfer participants to include career advancement targets as motivators, for both the knowledge source and the knowledge receiver. We found it critical to ensure the knowledge source supervisor's cooperation in regard to career advancement. The knowledge source supervisor was asked to to discuss the activities the knowledge source would conduct after the knowledge transfer was completed. We found that in all but two of our pilots, this condition was not met (pilot one of phase two and pilot two of phase two; the latter failed because of inadequate planning). Only when the knowledge source did know about his next career step did we observe the required commitment for participation and a successful knowledge transfer could be observed (pilot one of phase two). In addition, we asked participants to include in the manifest a clear knowledge receiver selection rationale, a knowledge transfer milestone and delivery targets – either documentation or work performance metrics - based on the knowledge item specification. We noticed that leaving out the selection rationale of the knowledge receiver made pilot two of phase two ultimately fail, because the knowledge transfer project manager decided to omit defining why the receiver was selected.

While we have developed knowledge transfer manifests of some sort for the pilots in the first phase, they were not signed by the knowledge transfer parties and were only available on an electronic platform. The second pilot phase began with one such manifest that was improved by the knowledge transfer project manager and finalized by the method engineer to match the organization's requirements (ME1, ME2, PL1, PL2).

The document required to finish the preparation phase described the documentation of the knowledge item with regard to the product and tasks related to the knowledge transfer. Adhering to the organizational documentation policy (ME2), this document provided an opportunity to synchronize the knowledge transfer with the organizational knowledge management. As we learned in pilot one of phase two, it was best to choose an abstraction level just above or below the work product's[63] design (e.g., software design; see also section 6.5.6.5 on documentation levels). A design level provides useful information for other employees, while the preparation of the document also provides a value for the author in terms of structuring the relevant content (i.e., structured thinking facilitation) and the future reference document.

When entering the transition phase of the knowledge transfer process, the most important documents were work performance reviews. Most organizations will have their own documents in this area. The work performance reviews and measurement of the knowledge transfer goals specified in the knowledge transfer manifest provide an opportunity to synchronize the knowledge transfer with human resource targets, if necessary. In larger knowledge transfers, these progress measures are likely to be controlled by a dedicated program management office role.

Once the knowledge transfer was to enter the integration phase, the knowledge receiver was to begin distributing his or her knowledge in special types of workshops. For these workshops a specific document has been designed which lists lessons learned and makes successful practices available to the organization. The document structures the lessons learned in such a way that it is easy for other organizational entities to understand when the practice can be used and how it is performed.

We learned from the first pilot phase that document-based knowledge transfer approaches grant more freedom regarding which role provides which information. This provides greater flexibility for reacting to several organizational situations and settings - e.g., a team leader of a large team may delegate some work to his or her assistant, while a leader of a small team creates the document in a weekly meeting. Even though the document-based approach does provide flexibility, the information asked for by the documents should be collected. The project manager in the second pilot of the second pilot phase decided to omit the justification for choosing the knowledge receiver. He also omitted a detailed description of the knowledge item. Though the knowledge receiver and the knowledge source were capable of sorting out which knowledge was wanted for the transfer, the missing justification was more critical. Once the knowledge transfer entered the transition phase, it became apparent that the knowledge receiver was not capable of conducting the relevant work. This lack of qualification would have become clear to the knowledge transfer manager had he tried to write a justification of this knowledge receiver working with the knowledge to be transferred.

Now that we have finished explaining the different documents and how we discovered their usefulness, we will summarize the various roles already mentioned. We were able to identify ten

[63] Refers to any result of a production process of a firm. For example the work product of a automobile firm is a car, its design therefore represents a good candidate to prepare knowledge transfer related documentation.

roles. These are illustrated in Figure 5-21. However, much fewer people are required in a small knowledge transfer initiative. The knowledge transfer sponsor and the program management roles suggested by ME2 can be executed by the same person, for example. Likewise, the roles of knowledge receiver supervisor, project manager and program office - suggested by ME2 to support the program manager in large knowledge transfer initiatives - can be fulfilled by a single second person (pilot one of phase two). Depending on the complexity of the knowledge transfer, a coach or other specialist may be required in consulting roles. During both piloting phases we noticed that managers required help with the creation of the knowledge catalog, for instance. We also observed, during pilot one of phase one, that the project manager was incapable of leading the knowledge transfer. Therefore, we introduced the coaching role. One manager at the knowledge source firm should also be involved. Our experience with all pilots showed that, without the knowledge source firm motivating their employees with true incentives, knowledge transfer initiative success is put at risk. This aggregation of roles puts the number of people related to a knowledge transfer at least to five. From our experience in all pilots, oversight of the knowledge transfer is best placed with the knowledge receiving organization. During the first piloting phase we observed that pilots with team A were more difficult to manage. We established that this was due to the team's knowledge source employees not reporting directly to the knowledge receiver supervisor – as they did in team B. Therefore, in the second piloting phase we made the knowledge source report directly to the knowledge-receiving organization's project manager. The increased authority of the knowledge-receiving organization made it much easier to manage the knowledge transfer and to demand results from all involved parties.

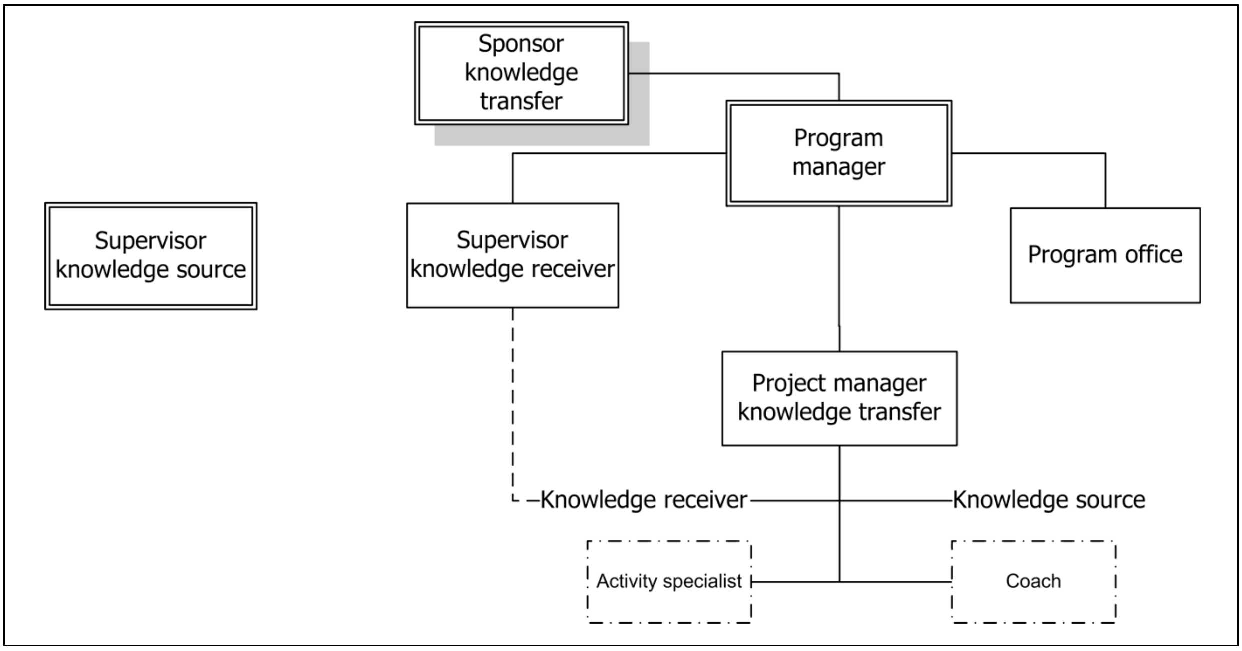

Figure 5-21: Knowledge transfer related roles in pilot research

While the organizational chart presented in Figure 5-21 represents our findings from the pilots, we did encounter different configurations. However, these resulted in problematic management issues and are not recommended. Particularly difficult are situations where the knowledge source is reporting exclusively to a superior of the knowledge source organization. We observed two such cases, pilot one of phase one and pilot three of phase one. Both failed because ultimately the knowledge source did not have to answer to the knowledge-receiving organization's management.

The next section will explain in detail how roles and documents are involved in activities and specialized techniques.

5.2.4 Results regarding activities, techniques and tools

Since many activities and techniques presented themselves as possible candidates, we had to reduce the set of possibilities to a specific and practical set of choices. In order to do so, we took the researched techniques from our literature review as well as suggestions by field and research experts and asked our method engineer (ME1, ME2) and project manager (PL1) to prioritize the techniques and activities. In addition, we asked them to relate the activities and techniques to one or more knowledge transfer phases (PL1). Three of the techniques – war stories, history data recovery and semi-structured interviews – were classified by the experts as not practical at all and consequently excluded from the ranking process. These three techniques were failures and not used during the pilots, despite having been scheduled for application. This discussion with field experts (PL1 was also a method expert at the time) led us to discover as well that many techniques and activities were essentially describing the same actions, and we eliminated these duplicates too. This process greatly reduced the list of activities we chose for our pilot application. Figure 5-22 shows the final list of techniques and activities with their respective prioritization (1 – needs to be included; 6 – should not be included at all in the method). All of the activities finally chosen are marked by their final name in brackets in the following table. Techniques have the activities they are supporting added in brackets.

Candidates	Type	Knowledge transfer phase	Priority
Buddy support for novice (tandem)	Activity	Preparation, Transition	1
After action review (ad-hoc/project reflection)	Activity	Transition, Integration	1
Learning histories (in tandem)	Technique	Preparation, Transition, Integration	1
Demand analysis - DEAN (knowledge identification)	Activity	Initiation	1
DeRoge (knowledge transfer planning)	Activity	Initiation	1
Self study (self study)	Activity	Preparation	2
Step wise responsibility takeover (in tandem)	Technique	Transition	3
Knowledge hub (in tandem)	Technique	Transition, (Integration)	3
Documentation (in self study)	Technique	Preparation, Transition, Integration	3
Advisor model (in tandem)	Technique	Preparation, Transition	3
Knowledge assets (in self study)	Technique	Preparation	3
Knowledge transfer experts	Technique	Preparation, Transition, Integration	4
Reflective practice	Activity	Initiation	4
Power packs (in self study)	Technique	Preparation	4
Refactoring (in self study)	Technique	Preparation	5
Just in time learning	Activity	Integration	6

Figure 5-22: Practitioners' classification of knowledge transfer activities and techniques prioritized from 1 (high) to 6 (low)[64]

The field experts suggested that a knowledge transfer method in IT-sourcing initiatives should focus only on the top-ranking practices. Therefore, they asked us to implement the method based on activities or techniques ranked two or better (PL1, C2, C1, P1). The reason to limit the set of activities was to first establish a set of reference activities within the methods framework. Later versions of the method may expand the list of activities. Furthermore, the practitioners were concerned that a method with more than a couple of activities would become too complex for the organization to understand (ME2). Without an understanding of the method, C2, ME2 explained, execution would become increasingly unlikely. Since the following chapter presents the final activities in detail, the next paragraphs in this section focus on particular events and observations leading towards the final activity and technique configuration. The discussion will follow the order of the knowledge transfer process. We will explain how the chosen activities borrowed from other less highly prioritized activities and why. In addition, the presentation shows which techniques were chosen to be included in a given activity. We will finish this section by presenting observations regarding IT tool support for these activities.

The knowledge identification activity involved data collection and data consolidation techniques. For the initial data collection during the first piloting phase, we tried three techniques: employee interviews, workshops with team leaders and reusing existing data sources such as technical

[64] Refer to section 2.1regarding the difference of techniques and activity.

categories (used as terms to identify knowledge items), business processes[65] (used as terms to identify knowledge areas) or role and responsibility data. Only the combination of the last two techniques produced practical results. Therefore, we collected technical category data at an abstraction level (defined by the employees in question) as well as roles and business processes data. Subsequently, we assisted team supervisors in consolidating the collected data. We asked them (C10, ME1) to link technical terms to one or more business processes or roles and to specify an operational urgency. We asked the field to link roles and responsibilities to the technical terms only in the first pilot phase. In the second pilot phase such an attribute had been omitted based on the protest of ME1, but the lack of this relationship made the linkage to a business process very difficult. The attribute was finally included in the knowledge item catalog after consultation with ME1. Unspecified or ambiguous wording of technical terms made it difficult for practitioners to classify terms (C10). Therefore, we included a synonym attribute and demanded a short description for each knowledge item to be included in the knowledge catalog. Consequently, based on our field experience, the consolidation workshops with each team supervisor should also verify not only that the initial terms are linked to business process but that links to roles and responsibilities are provided. Furthermore, short descriptions and synonyms needed to be specified for an unambiguous specification of a knowledge item. To produce an acceptable knowledge item catalog, we found that several review cycles and rigorous delivery control of interim knowledge catalog versions were required. In addition, a dedicated role was required for preparing consolidation meetings by identifying synonyms and ensuring that information regarding all mandatory knowledge item attributes had been provided (i.e., a knowledge engineer, a role taken by us as researchers for the time of the pilot research). Synonyms proved to be an effective tool for solving naming disputes by pleasing both parties at the same time. The consolidation meetings themselves were best conducted with only one team supervisor at a time until revised results could be shared with other team supervisors for further consolidations among different teams. Sharing team-specific knowledge catalogues too early often resulted in naming disputes among teams and misunderstandings (C10, ME1). In the end all knowledge-identifying teams could use the knowledge item catalog to identify experts regarding several knowledge items within their team, therefore creating a beneficial side effect of making expert finding less difficult. In addition, the identified knowledge items might have been used for further employee development in relation to human resource development plans[66] –

[65] In our particular case financial services business processes were used. Any other industry business processes may be suitable.
[66] These side effects may in fact become major motivations for an organization to practice the knowledge identification activity, as they allow the effort to be applied for some long-term organizational development targets. In addition, the side effect often allows the activity to be, at least partially, financed by the human resource department.

thought we did not investigate the matter further as it relates to human resources, which was not part of our research.

In parallel to the knowledge items definition, the strategic importance of each knowledge item had to be established. We found that assigning a strategic importance for each knowledge item individually was not feasible. We expected knowledge item catalogues to grow along organizational hierarchies; managers and executives therefore would have had to invest an unjustifiable amount of time rating the knowledge items. We found that it was best to derive the strategic importance of each individual knowledge item from the assigned knowledge area. The knowledge areas in turn were related to a limited list of strategic targets by managers, and the strategic importance of a knowledge area was derived from the frequency (i.e., relative probability) it was assigned to one of the strategic targets. The strategic targets were also ranked by managers to weight the frequency of each knowledge area with the relative rank. We successfully conducted such a strategic ranking during the second phase of our pilot research with the support of C2 and C1. A beneficial side effect of such an approach appeared: business processes that were chosen as knowledge areas got an automatic review regarding their strategic impact[67].

Once the strategic importance had been mapped to the knowledge item, the knowledge item catalog presented two lists. One list showed knowledge items where strategic and operational criteria were ranked equally. Another list showed deviating priorities. From the first list knowledge items were selected for immediate knowledge transfer; knowledge items which were not necessary to transfer were also noted. The list of knowledge items for which strategic and operational priorities were different could have been consolidated in a joint meeting of management and operational staff. However, such a meeting was not conducted in any of our pilot settings. Therefore, we collected feedback regarding the final list of knowledge items from operational staff, adapted the list and then asked management staff to decide on a list of knowledge items to be transferred. A meeting would have been much more efficient, but the iterative process was forced upon us by the unavailability of the responsible supervisors, managers and executives. Even though we involved all stakeholders, we experienced significant resistance from operational staff (primarily C10 and ME1) when they were asked to implement the chosen knowledge transfers. Therefore, in order to increase acceptance and execution speed of the final knowledge catalog, we included a consolidation meeting between management and operational staff in the final version of the method.

[67] This particular side effect may also help motivate managers to conduct the activity, since long-term utility is easier to explain in direct strategic terms than in the terms of the more indirect benefits of knowledge transfer.

Once a list of knowledge items was specified, the knowledge transfer planning activity was initiated. Our initial design during the first piloting phase for the knowledge transfer planning was named "DeRoge" and entailed a multi-person process in which each person was assigned specific process steps and information bits to provide. The process also involved single blind profiling of knowledge transfer participants capabilities and consolidation of the capability classification among stakeholders. While the process had the potential to create enough data to facilitate the selection of appropriate knowledge transfer techniques for subsequent knowledge transfer activities, the process became very time-consuming. Feedback from the first pilot phase made us abandon the process. Consequently we focused on a knowledge transfer manifest document composed of data from the original process, allowing the stakeholders more degrees of freedom in collecting the information. For instance, the earlier process asked all stakeholders at the same time to suggest ideal knowledge sources and knowledge receivers and then consolidated the feedback. This was impractical, since the knowledge transfer project manager in all pilots had already defined a person to receive the knowledge. While theoretically a knowledge receiver is selected based on defined skill criteria, the profiling was impractical, and often employees matching the profile were not available to the knowledge-receiving organization. Therefore, the whole process did not produce any actionable results. In all but one pilot (pilot two of phase two), the knowledge receiving organization had to work with the employees it already had. Since employee transfers and the hiring of ideal knowledge receivers were infeasible, motivational and control aspects became more important.

While all documents could have been prepared by the knowledge transfer project manager, we noticed that the acceptance of the knowledge transfer manifest was best achieved if a draft version of the final document was discussed among knowledge source, knowledge receiver and knowledge transfer project manager (pilot one of phase two, pilot two of phase two). Once modifications had been applied, we asked the knowledge source, receiver and project manager to sign the knowledge transfer manifest as an expression of their commitment to the project. While we have observed successful knowledge transfers without such signatures (pilot one of phase two), we observed that most pilots during the first pilot phase (all except pilot two of phase one) failed because of lack of commitment by both knowledge transfer project managers and knowledge source and receiver. In particular pilot one of phase one displayed the adverse effects of a lacking commitment. Although we prepared detailed project plans and milestones to which all parties agreed, the milestones were not honored and the responsible knowledge transfer project manager did not control the progress. Hence, the knowledge transfer took much longer than planned and produced only one of the targeted documents. Furthermore, the pilot was abandoned after the self-study phase, since the knowledge receiver never picked up actual work related to the acquired knowledge. Though this was a planned outcome, the knowledge receiver was also intended to train a newly hired colleague regarding the knowledge he obtained. A task, we observed, he was not able to perform once a new knowledge receiver was employed. Based on this experience, we learned that every knowledge transfer needed to be connected to an actual application of knowledge.

In order to keep track of the various pilots, we (acting as the knowledge transfer program manager) recorded the knowledge transfer targets in a program management file. In addition, a joint information event helped all employees involved in the knowledge transfer initiative we were observing. The information event helped all employees to feel that they are part of a larger initiative and that their work in the knowledge transfer initiative has an important purpose for the knowledge-receiving organization. We initially failed to organize such an event during our pilots, and subsequently the participants often complained about the additional burden of being "experimented on." Once we received renewed management support and leading managers (C2, C3) from the knowledge receiving organization organized such an event and explained in person the significance of the project, resistance lowered, and the knowledge transfer work was taken more seriously. However, since none of the knowledge source firms' managers explained the knowledge transfer at the given event, a climate of distrust remained to some degree and had to be dispelled in individual meetings. Therefore, a joint presentation by managers from the knowledge source and knowledge-receiving organizations was found to be the best approach (C4, ME1, PL1).

Following the initiation stage, one of the first activities in the execution stage was the self study activity composed of documentation, question-answering and reviewing techniques. The self study activity was the result of aggregating several experiences with different documentation techniques we had been using throughout our pilot research. During the first pilot phase we tried to implement knowledge asset and power pack documentation techniques. We tried these documentation techniques because the field indicated that some kind of proof had to be provided to show that the existing explicit knowledge had been reviewed by the knowledge recipient (P3, P5, P9). Moreover, the process of creating the documents, re-structuring the existing content and adding new observations to it guided the knowledge receiver to an understanding of the existing documents. Misunderstandings were easily spotted by the knowledge source in document reviews (pilot one of phase two), because they had resulted in an inaccurate or imprecise document. However, the documentation transformation process required a clearly defined target documentation format, as knowledge transfer participants explained (pilot one of phase two). They requested a documentation policy be defined at the knowledge-receiving organization and asked for organization-wide documentation. While such a policy was emerging during the course of our pilot research, we found that the teams under observation did not know about the organizational documentation policy. Hence, we often had to ask a knowledge source to provide a target format for the knowledge receiver (pilot one of phase one, pilot two of phase two).

As soon as the target format was understood by the knowledge receiver, he could largely work independently and complete the document. The pilots that actually executed the self study-related techniques (pilot one of phase one and pilot one of phase two) successfully completed the document once the template had been provided. Where no such documentation template was provided (pilot two of phase one, pilot three of phase one, pilot four of phase one, pilot two of phase two), they failed to finish the preparation phase. A critical aspect of the self study activity was to ensure that the knowledge source was available for questioning by the knowledge receiver. Initially, we planned semi-structured interviews during fixed meetings to solve questions of the knowledge receiver. However, the knowledge receiver and knowledge source rated this technique too time-consuming; they preferred to get in touch on a case-by-case basis (pilot one of phase one, pilot two of phase one, pilot one of phase two). As a consequence, we reduced the planning intervention to reserve only enough time for questions from both parties, allowing them to schedule their time as needed. However, we continued to require, that all questions and answers be recorded in written, therefore in effect producing a learning diary for future reference (best observed with C25). This design was rigorously applied in pilot one of phase two and well received by the participants. In the end, once the knowledge receiver finished the documentation, the knowledge source would review the documentation for completeness, accuracy and precision. This technique was applied in all documentation efforts during our pilot research and well received by all knowledge transfer recipients. One supervisor (C10) at the knowledge-receiving organization remarked that the end of the self study marked the point at which the whole knowledge item documentation was complete and delta documentation could be abandoned[68]. Finally, owning a complete documentation set greatly increased the confidence of the knowledge receiver. Because of the documentation he was convinced he could handle future problems once he took over responsibility from the knowledge source in the tandem activity (C24). Well-written documentation also increased the confidence of the knowledge source in the knowledge receiver's abilities (P15).

[68] Delta documentation relates to a documentation technique in which the original and complete set of documents is not updated, but only the changes are recorded. Such a technique usually fails to identify invalid documentation and is difficult to understand, but much faster and more cost effective to create – at least in the short term.

Towards the end of or after the self study, the tandem activity gradually allowed the knowledge receiver to apply the knowledge. We scheduled a tandem activity for pilot three of phase one and pilot two of phase two. However, it was only executed in the latter. We planned the tandem activity to include a phase where the knowledge receiver would start to execute the tasks related to the knowledge item being transferred. While the knowledge receiver would execute the tasks, the knowledge source was still responsible and therefore closely followed the knowledge receiver's actions. Such a set-up was required because the relevant framework contract assigned responsibility to the knowledge source firm, and the knowledge-receiving firm wanted to keep this agreement until they were confident that sufficient knowledge had been transferred. Therefore, the work results were regularly compared by the program office with the work performance metrics defined in the knowledge transfer manifest. To provide some indication of how the knowledge receiver was handling the tasks, he was required to write down his daily experiences and share these with the knowledge source. This exchange allowed for problems to be escalated to the knowledge source and for the knowledge source to intervene if a situation became critical. During pilot two of phase two several such critical observations were made by the knowledge source and reported to the program manager. In the end the program manager aborted the pilot because the knowledge receiver could not yet achieve the defined work performance metrics. In pilot one of phase two some sort of tandem was also performed, but the initiative was entirely unplanned by our research. The knowledge receiver was asked to perform certain tasks and continually supported by the knowledge source. The knowledge source retained responsibility for the whole period, but the knowledge transfer project manager carefully reviewed the progress of the knowledge receiver's work performance. Once the knowledge source and knowledge transfer project manager were satisfied with the work performance, responsibility was transferred to the knowledge receiver, and the knowledge source was only available for a very limited time thereafter. In fact, this knowledge source was leaving the company for retirement. Finally, the pilot entered the integration phase and the knowledge receiver became fully responsible for the knowledge item, including updating the relevant documentation.

Originally we intended to synchronize the integration phase with the organizational knowledge management infrastructure. Therefore, no activities were planned for this phase. However, during our second pilot phase a team in the knowledge receiving organization (C46) approached us and asked if they could benefit from one particular activity we had prepared for the integration phase but not planned to execute. In particular this additional team was interested in an adaptation of the after-action review, with a different knowledge source organization. We initially named the resulting activity reflection (later divided into ad-hoc reflection and project reflection). The reflection activities were composed of group techniques for reducing tensions among participants and were able to capture knowledge from more than one knowledge source. Particularly techniques such as storytelling (ad-hoc reflection) and focused brain-storming (project reflection) were employed. The reflection activity was executed in a relaxed and hierarchically neutral atmosphere. The goal was to produce a list of lessons learned, particularly sets of successful actions to repeat the next time a similar situation was encountered. The project manager (C46) and the knowledge source, as well as the knowledge receiver organizations in this unexpected pilot, found that such reflection meetings greatly helped to deepen and broaden their group knowledge. These meetings helped to distribute knowledge within the knowledge-receiving organization, though the project reflection only provided project management knowledge and improvement measures (ME2).

Software tools for distributing knowledge were also applied. In the first piloting phase we asked all pilot participants to use Wiki software[69]. We chose Wiki software because several people in the field indicated that a central location had to be established for all knowledge (C28, C34). The field also noted that such a central location should be easily accessed and provide search functionality (C33). Wiki software is easily accessed through a browser interface and provides extensive search functionality. In addition, the Wiki software allowed weblogs to be maintained and templates to be created. The former were intended to support the question-answering activities throughout the knowledge transfer; the latter supported the documentation activities. Furthermore, the productivity software tools Microsoft Excel, Microsoft Word and Microsoft Visio were employed for documentation purposes. However, the Wiki and weblog tool was used only sparingly in the first pilot phase. The pilot participants preferred to use Microsoft tools. Asked why they did not use the Wiki and weblog software, they gave various answers. Most pilot participants found the Wiki software too difficult to use (C30, P11, ME1, C22). The software did not allow them to easily format text, as they were used to doing in Microsoft Word (C22), and the Wiki software did not easily integrate with other tools used by the pilot participants (ME1). The weblog features of the Wiki software were found by the pilot respondents to be too basic to allow proper expression of their thoughts (ME1). In addition to these usability problems, most piloting participants did not understand the rights management of the Wiki software very well and therefore mistakenly thought all of their colleagues at the firm could access the data (ME1, C10). Moreover, the requirement of frequently visiting a web site without finding much new content, as required by some activities, further reduced the acceptance of the Wiki software (P11,

[69] SnipSnap version 1.0b3

P15, C22). These usability and organizational problems led us to replace the Wiki software for the second pilot phase. We looked for software that would easily integrate with the applications already used, provide search functionality, notify authors if changes occurred and provide a more transparent rights management system supporting personal and team-specific sites. In addition, several field sources explained that they wanted to browse the knowledge in a graphical representation (C30, C33) and that they expected the application to be easily expandable with domain-specific workflows and external data sources (C30, C34). The detailed software tool requirements observed in the field are summarized in Appendix X. While we launched specific software development efforts to create a graphical knowledge representation and to support the knowledge transfer with detailed workflows, the resulting software was not used during any pilot. Therefore, we are unable to share any details of these separate research efforts.
After providing a short list of five software solutions to the sponsor firm, representatives of the firm found that Microsoft Office Sharepoint Server 2007 best suited their environment and met their needs (PL1, C2, C4). Therefore, Microsoft Office Sharepoint Server 2007 was used during the second pilot phase. The chosen software solution was more successful then the simplistic Wiki software used in the first pilot phase, allowing users to work with the familiar desktop tools and share their work through the server software. In addition, users did not have to learn new passwords and group management systems but were able to use the already existing rights management system. Furthermore, supervisors could set access rights through the same tools already used, and creating team specific web site portals was quickly understood and rapidly adopted by supervisors – even by teams not part of our piloting research (C47, C49). The search functionality of the new software solution allowed users to search content not only within the software but also in existing file repositories. In addition, the new system used list-based content organization, while the software in the first piloting phase used strictly document-based content organization. Apparently the list-based approach worked much better, as users no longer told us they were confused by the content structure (ME1). Finally, no pilot participant had to check web sites manually anymore. The software system could be configured to send e-mail notifications to any interested party if a change to a document or any other content item was registered. While the software tool support preoccupied our field for quite some time, the scientific conclusions were unspectacular and therefore are not explored in depth in this thesis. Though we derived a list of requirements of software tools in an IT-sourcing knowledge transfer context (Appendix X), these requirements are similar – while more detailed - to suggestions by other authors (Gottschalk 2005).

We continue in the next section by summarizing the observations found throughout the pilot research.

5.2.5 Summary of piloting findings

In this section we will summarize the findings of our pilot research and link them back to the original assumptions and constraints put forward during our literature review. Following this summary we will compare the elements we found to be different and the ones confirmed in the pilot research based on the observed results presented in the preceding sections.

With regard to the first set of assumptions (pre-conditions), we found that performance-based metrics (assumption item 1.1) and identifiable knowledge items (assumption item 1.2) were very useful in controlling the pilot knowledge transfers (pilot one of phase two and pilot two of phase two). Specifically useful metrics were the quality of defined documents and, later, the work quality (both new observations). In contrast, knowledge identification, a rather difficult and time-consuming effort at the outset, had to be drastically reduced in scope. Developing a dyadic knowledge transfer method (assumption item 1.3) was found by practitioners (C1, P1, ME2) to be a better choice than a many-to-many knowledge transfer method. During the first pilot phase our initial many-to-many knowledge transfer set-up was reduced by the sponsor firm's executives to a dyadic knowledge transfer, and further development of many-to-many knowledge transfer activities was not requested (C1). Similarly, the second phase of pilot research showed a demand for only a one-time knowledge transfer (assumption item 1.4). Interfacing with the knowledge-management (assumption item 1.5) and IT-sourcing institutions (assumption item 1.6) was more difficult in the pilot research than the case study and literature findings suggested. While a knowledge management role (assumption item 1.5.1) had been established as a corporate function (C38), a knowledge management policy was not established and knowledge management procedures were not practiced. Therefore, documentation activities were complicated. In addition, a documentation policy was only established during our research (C49) and, in contrast to the case study findings, not enforced by the IT-sourcing contract (P2). Nevertheless, many field sources recognized the need for such a documentation policy[70]. Moreover, the need for an information system-based knowledge repository (assumption item 1.5.2) for the created documents was established (pilot one of phase one, pilot two of phase one, pilot two of phase two). Specifically, search functionality (C28), personal and team-level document sharing (pilot two of phase one, C47, C41, ME2), change notifications (pilot two of phase one, pilot one of phase two), easy-to-understand list-based content structures (ME1) and

[70] For this reason we decided to reference such a policy as part of our method development in cooperation with the responsible department of the sponsor firm.

seamless integration into the knowledge receiving organization's software tool environment (pilot two of phase one) were demanded by the field (all new observations). Finally, we never had the opportunity to hand over results of the knowledge identification to a human resource role (assumption item 1.5.3) for integration into the career development plan of the knowledge receiver, despite both method engineers suggesting such coordination. Even though such a liaison role was highly recommended by practitioners (ME2, C2), our pilot research did not witness the involvement of any human resource representatives during the project – though after the project concluded we were informed (ME2) that the human resource department was getting involved after all. The career development aspects of the knowledge identification were handled by the respective team leaders (new observation) (ME1, C10).

The alignment of the knowledge transfer initiative with the overall IT sourcing initiative was less salient in the pilot research than in the case study research. While we were able to identify one manager (C2) to be in charge of contract monitoring and relationship management (assumption item 1.6.1 and 1.6.2) with the vendor, formal service delivery and contract reviews were not conducted. Similarly, business targets and schedules (assumption items 1.6.3 and 1.6.6) were not clearly defined at first. The backsourcing initiative, and therefore the knowledge transfer, only improved once these targets were specified and communicated to the vendor. More specifically, we found we had to specifically reserve time with the knowledge source and knowledge receiver (assumption item 1.6.4); otherwise, both resources would have been booked for other projects and not engaged in knowledge transfer activities (an issue with all pilots in phase one). In addition, we confirmed that sound reasons for a knowledge transfer have to be communicated (assumption item1.6.8). The most common reason to engage in a knowledge transfer that we were able to observe was career change, either of the knowledge source, the knowledge receiver or, ideally, both (new observation). Wherever the knowledge receiver and source both had to expect negative career consequences if the knowledge transfer failed, the initiative was found to be successful; incentives and penalties turned out to be important success criteria, as claimed by assumption item 1.6.5.

Through the observations during the piloting research we were able to create more specific method principles. Regarding the control principle (assumption item 2.6), we found that the knowledge receiving organization had to establish proper controls (pilot one of phase two, pilot two of phase two). While the knowledge source can be contractually bound to cooperate on a knowledge transfer issue, the knowledge-receiving organization needs to track the progress (new observation) (C2, ME2, P9). This is in contrast to some claims discovered during our literature review, especially those in psychological contract theory, which claims (intrinsic) motivation as one of the most important aspects of knowledge transfers and discourages explicit contracts and measurements. Our observations showed that only pilots in which this progress control was conducted performed a successful knowledge transfer method usage (pilot one of phase two, pilot two of phase two). As soon as the continuous control dropped, the knowledge transfer deviated from the plan and got side-tracked (pilot one of phase one). The side-tracking resulted in longer method execution time and higher costs (pilot one of phase one). However, controlling the progress did not suffice. We observed that the work quality and the knowledge depth had also to be assessed (new observation) (pilot one of phase two). All pilots where work quality assessments were conducted showed a successful knowledge transfer method usage. The need for controlling elements in the knowledge transfer initiative required that firms follow pre-arranged steps. Therefore, a structured process was followed in all pilots (assumption item 2.5). The less structured a pilot was, the less successful and the more expensive it became. The least structured and least controlled pilot (pilot one of phase one) took more than twice as long, did not produce the intended documents and never resulted in any responsibility taken by the knowledge-receiving organization. This was in contrast to the most successful pilot (pilot one of phase two), which was well structured and carefully controlled. It was because of the structuring principle that we were able to link roles and documents to a given set of activities.

As claimed by our literature review, trust in the fact that the knowledge receiver was capable of understanding the knowledge and demonstrated professional skills indeed played an important role (C32, C33, P2). However, personal characteristics also mattered (C34 and to some degree, pilot one of phase two and pilot two of phase two). But since personal characteristics could not be modified post-hoc, the knowledge source just had to be dealt with and personal matters had to be put aside. Therefore, in explaining our results, we will stick with a trust model without including benevolence. In addition, we found that small demonstrations of skills, such as a well-documented piece of software or well-written source code, improved the knowledge source's trust in the knowledge receiver's skills (pilot two of phase one, pilot four of phase one, pilot one of phase two). Therefore, building skill-based trust over time became an important component of the trust principle (new observation).

Trust coincided with the transparency principle. While the backsourcing initiative remained poorly communicated, neither sides' employees fully trusted those of the other firm. Only when the goals of the knowledge source organization for the time after the knowledge transfer were more broadly known (i.e., during the second phase of the pilot research) and the knowledge-receiving organization communicated its own goals, did the trust levels improve. This confirms the transparency claim derived from the literature review (assumption item 2.4). Furthermore, we found that the implementation of a process itself improved the transparency significantly, because as soon as the process was first discussed, most employees began to understand what was being done and how it affected them.

Important knowledge of the knowledge source organization was not documented, since the team was relatively small and had little employee fluctuation. Therefore, there had been little need to document in the past (P1, P2, P5, P9). As a result, a significant part of the knowledge had to be externalized, documented and later internalized by the knowledge receiver. We found that this externalization worked best when the knowledge source and knowledge receiver formed a team and worked closely together (assumption item 2.3). It was most practical if the knowledge receiver actually executed the relevant activities and the knowledge source only helped out through careful suggestions (new observation) (pilot one of phase one, pilot one of phase two). However, to avoid misunderstandings, the knowledge source was asked to support the knowledge receiver through means visible to a third person (new observation). While joint responsibility was discussed and encouraged during our pilot research to enforce the participatory work style, managers found it impractical to implement and preferred to rely on defined hand-over schedules (pilot two of phase two).

The motivation to participate in knowledge transfer activities largely resulted from career incentives, either advancement (pilot two of phase two) or being allowed to retire (pilot one of phase two). This is in contrast to some cases in the case study research where financial incentives were employed. In contrast to our earlier assumptions (assumption item 2.2) of using a mix of material and immaterial incentives, the knowledge-receiving firm decided to abstain from financial incentives for the knowledge transfer. However, since this resulted in a significant wage gap between knowledge-source and knowledge-receiver employees, such a choice does not seem to lead towards successful knowledge transfer. Knowledge transfers were only successful where the career advancement incentive was absolutely maximized; i.e., being hired if the knowledge transfer succeeds, or the knowledge source leaving the company. In addition, we found that the motivators for the knowledge source and receiver need to be symmetrical, of a comparable incentive size and type (new observation) (pilot one in phase two, pilot two of phase two). Such a motivation schema requires that the knowledge source organization and knowledge receiver organization agree to a defined motivation policy for the duration of the knowledge transfer.

Because of the structuring principle a series of structuring elements could be introduced; they were observed as part of a comprehensive procedure model. The procedure model, as noted earlier in this section, encompassed certain grouping of knowledge transfer activities and synchronization of the knowledge transfer with its organizational environment. Our initial process structure entailed four steps: initiation, implementation, ramp-up and integration, in accordance with Szulanski 1999 (Szulanski 1999). However, while the literature described these phases more in terms of activities, our initial assumptions were that these phases could be directly transformed into activities. In practice, the abstract phase descriptions were not suited for our field. More detailed instructions were required (pilot two of phase one, pilot one of phase one) for individuals to perform the necessary steps. Therefore, we restructured our entire earlier field-chosen (PL1) activities and techniques and adapted the phase naming and order to match our field observations. In particular, the phases were named: initiation, preparation (adapted from ramp-up [ME2]), transition (adapted from implementation [PL2]) and integration (adapted from assumption item 3.6). In addition, we found that certain activities had to be executed at least once for every knowledge transfer initiative in a particular order, while others could be executed in parallel and even repeatedly within a single knowledge transfer initiative. We grouped the mandatory activities into the planning stage (new observation) and the ones which could be executed in parallel into the implementation stage (new observation). Regarding the synchronization of the knowledge transfer with the new documentation policy (representing a knowledge distribution activity according to assumption item 3.2), the knowledge transfer would synchronize with the knowledge management after the preparation phase (new observation), after the transition phase (assumption item 3.8) and after the integration phase (new observation) (C49). The knowledge transfer process we were developing represented the knowledge acquisition process in the knowledge management framework of Probst et al. (Probst et al. 1999) (assumption item 3.1). The synchronization with the IT-sourcing initiative (assumption items 3.3, 3.4, 3.5 and 3.7) was less structured. The knowledge-receiving firm did not maintain any sourcing management process with which to synchronize. Instead, a contract renegotiation initiative requested knowledge transfer-specific recommendations (a process loosely matching the architecture phase and therefore assumption item 3.3), but the relevant contract clauses were dropped during contract negotiations. However, since no backsourcing initiative was conducted in support of the knowledge transfer, synchronization of the IT-sourcing transition phase with the knowledge transfer transition phase was not observable.

The role model we were able to establish included the roles of knowledge receiver (assumption item 4.2) and knowledge source (assumption item 4.1) without disagreement of the field. In addition, we were asked to create a set of roles with supervising character (assumption item 4.3), including a program manager role (assumption item 4.4) (ME2), a knowledge transfer sponsor (new observation) (ME2) and a supervisor role for both the knowledge source and the knowledge receiver employees (new observation) (done for all pilots, but particularly requested by ME2). In addition, we found it was necessary to define a role for a program office assisting the program manager in controlling multiple knowledge transfers (new observation) (ME2) and a project manager for every knowledge transfer (new observation) (ME2). Furthermore, while we did not find any role coordinating knowledge management activities (assumption item 4.5) in absence of an enforced knowledge management policy, a coaching role was sometimes required (new observation) to help involved employees and managers to comply with the emerging documentation policy and to solve personal difficulties emerging from each individual's personality attributes (particularly pilot one of phase one and pilot two of phase two). Finally, some activities (especially knowledge identification -- see below) required further assistance from an activity specialist (new observation). For the sake of simplicity, the field suggested that some roles be aggregated in smaller knowledge transfer initiatives (new observation) (ME2, PL2). Therefore, according to this suggestion, supervisor knowledge receiver, the project manager role and the program office role could, and if possible should (new observation) (ME2), be assumed by the same employee (new observation) (pilot one of phase two, pilot two of phase two, ME2). The sponsor and program manager role would ideally be assumed by a manager initiating either the IT-sourcing initiative or funding the knowledge transfer (new observation). Other roles, the field agreed, could not easily be joined. In particular ME2 asked that the coach or other activity specialists not be held accountable for the knowledge transfer results, but that the project manager of the initiative be asked to demand results from the participating roles (new observation).

In contrast to the literature-based role model, the information model derived during our literature review was less well supported by practical tests during our piloting research. In addition, the assumptions for the information model became much more detailed. The first two assumption items 5.1 and 5.2, while tested in pilot one of phase one to pilot four of phase one, failed to be accepted on practical grounds by our field. One informant in particular outright refused to provide the information we requested in the profiles because of its impractical nature (C10, pilot two of phase one, pilot one of phase two). Therefore, only field-selected (ME2) items were reused in a risk mitigation tool for program managers (fifth row in Figure 5-19) in the final document (new observation). Some literature based assumptions were moved to other sections. The organizational chart (assumption item 5.3) became part of the pre-conditions (first row in Figure 5-19). The pre-conditions were proposed to be examined by a checklist (first row in Figure 5-19) (new assumption) based on our experience in both pilot phases. The stakeholder list (assumption item 5.5) was subsumed as an escalation plan (fourth row in Figure 5-19) by the final document representing the development plan (assumption item 5.6). We also observed the knowledge-sharing policies (assumption item 5.4) importance, though it was also moved to the pre-condition section. The development plan became an important document for the knowledge transfer pilots we observed. While our early versions recorded only a definition of the knowledge to be transferred, the activities and milestones as well as basic rules and a simple schedule, we saw practitioners (ME1, ME2, PL1, PL2) refining the plan to produce a knowledge transfer manifest (seventh row in Figure 5-19) (new observation) which was even signed by the knowledge transfer participants to demonstrate their commitment (assumption item 5.9) (best shown in pilot two of phase two). Furthermore, the knowledge transfers observed in all our pilots relied heavily on documentation (assumption item 5.8). Particularly design documents (new observation) (eight row in Figure 5-19) and knowledge-item specifications (new observation) (sixth row in Figure 5-19) became important documents – especially during the second knowledge transfer phase, as the field realized the value of these planning documents. While the knowledge items (Figure 5-20) (each class a new observation) and a knowledge item catalog (second row in Figure 5-19) (assumption item 5.7) met initial resistance (ME2, C10) they later became a valued (C2, C1) instrument for managers.

In addition to these anticipated documents, review (ninth row in Figure 5-19) (new observation) and special activity documents such as ad-hoc reflection reports (last row in Figure 5-19) (new observation) emerged as useful aids in the activities. For program managers, a knowledge transfer program (third row in Figure 5-19) (new observation) was created to maintain an overview of the currently running knowledge transfer initiatives (ME2).

In order to create the documents mentioned throughout the preceding paragraphs, a series of activities and techniques was required. The initial activity assumptions listed four activities. First, the initiation assumption (assumption item 6.1) had to be split into a knowledge-identification activity (fourth row Figure 5-22) (new observation) and a planning activity (fifth row Figure 5-22) (new observation). The knowledge-identification activity required the collection of role (new observation) and business process (new observation) data through document analysis techniques (new observation). The resulting data had to be consolidated (new observation) and linked with an identifier (new observation) in individual workshops with each team's supervisor (new observation) separately (C10, ME1). To avoid ambiguous knowledge items, synonyms and short descriptions were used (new observation) (C10). The resulting knowledge items (see above) had to be qualified in terms of urgency and importance by supervisors and executives. Supervisors ranked each knowledge item of their own team directly (new observation), and executives ranked knowledge items indirectly through strategic importance of knowledge areas since direct knowledge item ranking would have been too much of an effort (new observation).

To increase transparency of knowledge transfer initiatives derived from the list of knowledge items (knowledge catalog) and to consolidate remarks by supervisors and executives, a consolidation workshop was found to be a useful technique (new observation). More detailed profiling of the knowledge source and receiver, while found to be helpful (ME1), was deemed too impractical for a knowledge transfer initiative (C10, ME1). However, several knowledge transfer-related attributes were recorded (in the knowledge transfer risk analysis document) to better manage the initiative's risks (new observation) as part of the knowledge transfer planning activity. The knowledge transfer planning activities' main task was to collect all the required data for the knowledge transfer manifest. Apart from the risk analysis, the knowledge transfer project manager had to task the knowledge source with creating the knowledge item specification. The project manager had to create a knowledge transfer schedule (new observation) and resource profile (new observation) using milestone techniques. Each milestone had to include clearly measurable performance targets (new observation) (pilot one of phase two, pilot two of phase two). Furthermore, once all information was collected, the knowledge transfer project manager had to organize reviews (new observation) of the knowledge transfer manifest to increase transparency (pilot one of phase two, pilot two of phase two). Moreover, an information event by the knowledge source and receiving firm was found to increase acceptance and transparency of the knowledge transfer initiative (C4, ME1, PL1) (new observation). The knowledge transfer planning activity also included negotiations with the knowledge transfer source supervisor. The main concern was to ask him to provide a career path for the knowledge source after the knowledge transfer finishes (PL1) (new observation) and to coordinate the two firms' incentive structures (new observation) (C33, C34, ME1). We found that unequal incentive structures between knowledge source and receiver (present in all pilots except pilot one of phase two) led to knowledge transfer failures. Finally, an important step concluding the planning process was to secure the signatures of the involved stakeholders (similar to assumption item 5.9 specified in the information model) or to at least receive a similarly credible commitment to execute the knowledge transfer initiative according to the knowledge transfer manifest (successfully tested in pilot two of phase two). Apart from the knowledge manifest, we found it best if the knowledge transfer planning also produced documents to track the progress of any knowledge transfer initiative by the knowledge transfer program manager and the program office (new observation) (ME2). These lists, however, were simply administrative documents updated by the person holding the program office role and did not require special techniques. The project manager was to be met on specific milestone dates to check the status and record that information in the file. Because this was the first time measurements could be provided as means to manage knowledge transfers, the continuous tracking of the status information during the whole knowledge transfer initiative, especially the work performance progress of the knowledge receiver, was found to be an important action (C2, ME2, PL2).

The second activity assumption our literature review revealed was externalization and documentation (assumption item 6.2). During the pilot research we found a much more specific set of assumptions and named the activity self study. The name was chosen because we observed that the documentation was most valuable to the knowledge-receiving organization if they were asked to produce the documentation on their own (new observation), supported only by a documentation template. The documentation template was either provided by the knowledge source (new observation) or prepared according to the organization's documentation policy (new observation) (pilot one of phase one, pilot one of phase two). The knowledge source only indirectly supported the knowledge receiver through informal comments on the learning diary (new observation) (C25), question-answering techniques (new observation) (pilot one of phase two) and reviews of documentation upon request (new observation) (all documentation-based pilots). The documentation served to increase trust in the knowledge receiver's abilities (P15).

We were also able to observe more detailed knowledge transfer aspects regarding the third assumption on knowledge transfer activities (assumption item 6.3). These observations were grouped within the tandem activity (third row in Figure 5-22). During pilot one of phase two and pilot two of phase two we observed that three stages of responsibility transfer were found to be practical (new observation) (seventh row in Figure 5-22), though pilot two of phase two was aborted in the first stage. In the first stage, the knowledge source held the responsibility and performed selected relevant work, while the knowledge receiver performed most of the relevant work. In the second stage, the knowledge source and knowledge receiver were both responsible, and the knowledge receiver was fully performing all relevant work. Finally, only the knowledge receiver was fully responsible and the knowledge source was only available for emergency issues. The joint responsibility made us name this activity tandem. In parallel, the program manager verified the work performance of the knowledge receiver prior to entering the next responsibility stage (pilot one of phase two, pilot two of phase two) (new observation).

Finally, the last knowledge transfer phase (assumption item 6.4) was initially thought to be integrated into the internal knowledge distribution process of the knowledge-receiving organization. Documents were intended to be handled by the newly implemented documentation policy (new observation). In addition, an HR policy required each supervisor to instruct specialists to ensure that at least one deputy specialist existed who could take over all responsibilities for a certain period of time if needed (e.g., for the length of a holiday trip) (new observation). However, we were asked by field representatives to provide an activity to further socialize and externalize knowledge of a specialist to some of his colleagues. Therefore, we adapted the after-action review technique and combined it with the reflection technique, despite our initial review focus on dyadic knowledge transfers, to create the ad-hoc and project reflection activity (second row in Figure 5-22). While the goal of both activities was to record best practices and lessons learned from a group of people (new observation), the ad-hoc activity was intended for direct execution after a task completed (new observation), and the project reflection was executed after a whole project (new observation), thereby producing project improvement measures (new observation).

Most of the literature-based techniques to support the activities had to be adapted or were not used at all. The face-to-face techniques (assumption item 7.1) were found useful by the field only in much more specialized form. While a variety of specialized meetings[71] were conducted for planning purposes, seminars were directly opposed by representatives of the knowledge source firm (P1, P2, P3). They argued that knowledge sources were not teachers. Therefore, they could not effectively conduct seminars (adapted assumption). The proposed buddy support activity (first row in Figure 5-22) and advisory techniques (tenth row in Figure 5-22) were modified and used throughout the tandem activity. In contrast to the traditional direct observations proposed by the advisory model, the monitoring had to be conducted indirectly (new observation) relying on the learning history technique (third row in Figure 5-22). The assignment of one specific knowledge source to assist one specific knowledge receiver was borrowed from the buddy support technique (new observation), but the support was much closer and extended to operational assistance and even intervention (new observation). The after-action review technique (second row in Figure 5-22), hierarchy-free (new observation) and best practice-focused (new observation), was adopted for the ad-hoc and project reflection activities. Both activities also employed the free form narration of an actual tasks performed (new assumption) suggested by reflective practice (13th row in Figure 5-22) and storytelling.

The result assumptions and constraints (mentioned in assumption item 8.1 and 8.2) became integrative parts of the more detailed information model assumptions and constraints therefore were removed from the list as individual items. The more detailed information model serves a much more practical purpose of defining results in terms of actual documents. The results to be achieved by activities are thoroughly explained in the activity section.

To support the previously mentioned techniques, we employed a variety of software tools. We used commercially available systems, since many of the software systems available could be

[71] Walkthrough reviews or even specialized meeting procedures such as ThinkLets Briggs, Vreede. 2005. thinkLets: Building Blocks For Concerted Collaboration v1 *thinkLets: Building Blocks For Concerted Collaboration*, 1-47. were used.

customized to suit our needs. In particular we observed two of the originally literature-derived assumptions. Both databases for knowledge storage (assumption item 9.1) and intranet usage for knowledge access (assumption item 9.2) were found to be important tools. Online forums were discussed but not used as part of the knowledge transfer we observed – though a separate knowledge management effort at the knowledge receiving organization did employ forums. However, as with all previous method element assumptions, we discovered numerous detailed observations. While the full catalog of software tool requirements is too large and too case-specific to be described at this point (it can be found in the Appendix X), we will outline the most salient aspects of this list.

The most surprising finding was that our originally proposed wiki software was rejected by the knowledge transfer participants, while wikis were readily used as an internal knowledge transfer tool at the knowledge-receiving firm already. Although the wiki software fulfilled the requirements for central knowledge storage (new observation), search functionality (new observation) and easy access (new observation), several usability factors impeded usage. We discovered that the knowledge transfer software needed to easily integrate with the software environment (new observation); especially the editing function needed to support familiar usage metaphors (C30, P11, ME1, C22). Ideally, users would not even have had to leave their familiar editor to contribute to the knowledge transfer system. Moreover, the structure of the relevant content was found to be important (new observation) (ME1). In addition, the knowledge transfer participants asked that rights management be transparent (new observation) (ME1, C10), because knowledge receivers were afraid of exposing themselves in the early stages of the knowledge transfer. Furthermore, users demanded a notification mechanism to inform them of any document changes in the software (new observation) instead of having to check numerous web sites daily to discover that nothing or little had changed. Finally, it was revealed that numerous knowledge transfer relevant sources existed within the organization. These sources had to be integrated into the knowledge transfer system (new observation) to maximize its usefulness in the long term.

The following section will summarize the observations above and those found throughout the case study research and formulate a conclusive set of IT sourcing knowledge transfer method requirements.

5.3 Summary and discussion of findings

In order to summarize the findings from both research streams, we consolidate empirical findings and literature based assumptions into a set of requirements suitable for an IT sourcing knowledge transfer method. We consider the overall method requirements to be on top of a pyramid. The pyramid is based on two raw data pillars, pilot observations and case study observations. These observations are presented in aggregated format through coding and case descriptions in section 5.1.1, 5.1.2, 5.1.3, 5.1.4 as well as 5.2.1, 5.2.2, 5.2.3, 5.2.4. These descriptive and qualitative results are further aggregated and compared to assumptions and constraints proposed by previous knowledge transfer and IT sourcing researchers in 5.1.5 and 5.2.5 respectively (see Figure 5-23 for an illustration). This section will consolidate all findings into one consistent set of final requirement items and associate the empirical data with the relevant literature. These final requirements will serve as reference for the actual knowledge transfer method described in chapter 6.

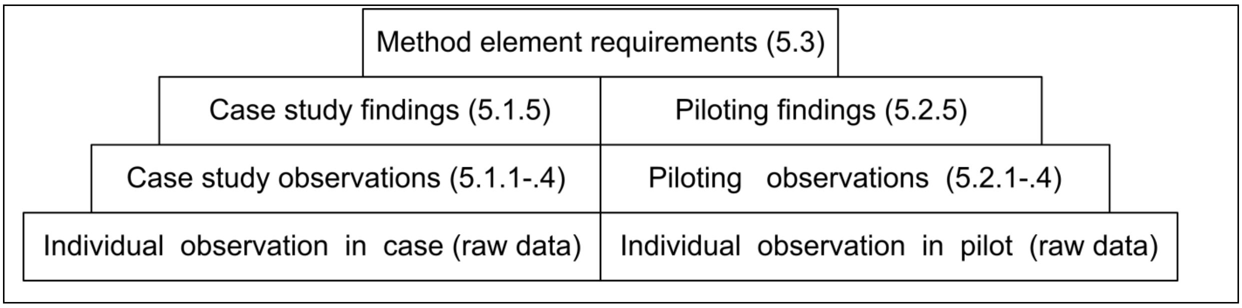

Figure 5-23: Requirements pyramid of the overall method requirements

The structure of the following presentation is slightly different in sequence than the earlier listing of findings in section 3.4. While we continue organizing the chapter according constituent method elements (Braun et al. 2005), we chose to improve the coherency of the text and to allow the reader to more easily understand the relationships among some requirements. Therefore we applied a different grouping. Specifically, the requirements of the tools method element have been merged with the precondition final requirements, while detailed software requirements of such tools can be found in Appendix X. Finally, the activity, techniques and results final requirements have been merged into one single final requirements category. This was done because we already presented the results regarding these method elements together. In addition, since activities produce results using specific techniques, the individual need for any single specification of one method element is best understood when presented together. Therefore, explaining each method element separately would impose an improper burden on the reader as we reference back and forth between different final requirement groups. The remainder of this section will present each final requirement group and briefly reflect on the literature characteristics where required. For an easy reference each requirement group will be summarized in tables that list where the rational for any particular method element requirement has been derived from; i.e., literature derived assumption, pilot research or case study research observation.

5.3.1 Pre-condition requirements

Pre-conditions as derived from the literature and summarized in Figure 3-12 have been largely confirmed by both case study and piloting research. This fact owes much to the enormous body of research in the field of IT sourcing regarding contract design. However, a particularly important field of research emerged only during the piloting research. Change management aspects as described by Vinson and Pung (Vinson and Pung 2006) began not only to influence the pilot design but also affected the pilot execution. Therefore, certain aspects had to be added to the IT sourcing knowledge transfer method assumptions, some could be defined more clearly and some had to be removed in light of our research results. Given the wide coverage of the change management field (compare (Various 2005)) we most certainly, even though unintentionally, refer to one or more change management techniques or principles when presenting the final IT sourcing knowledge transfer method requirement. However, every change related model will need individual adaptation (Dunphy and Stace 1993). Therefore we consider our contribution to represent the particular description of particular adaptations of the key aspects for IT sourcing knowledge transfers, including highlighting any change management related observations. Addressing any detailed change management aspects would be beyond the scope of this research. The following table lists the requirements chosen to be included as prerequisites. Following the table, we will discuss the relevant literature.

Final requirement item	Case study	Piloting	Literature
1. Measure success by performance metrics	X	X	X
1.1.1. Quality of documents documenting the knowledge		X	
1.1.2. Quality of work with respect to the knowledge		X	
1.2. Establish identifiable knowledge items	X	X	X
1.3. Plan for a dyadic knowledge transfer	X	X	X
1.4. Plan for a one time knowledge transfer	X	X	X

Final requirement item	Case study	Piloting	Literature
1.5. Interface with organizational knowledge management	X	X	X
1.5.1. Assign knowledge manager to knowledge transfer	X	X	X
1.5.2. Provide knowledge management IS	X	X	X
1.5.2.1. Provide document storage		X	
1.5.2.2. Provide document search		X	
1.5.2.3. Provide team level workspace		X	
1.5.2.4. Provide automatic change notification		X	
1.5.2.5. Provide list-based structure		X	
1.5.2.6. Integrate into existing software tools		X	
1.5.3. Interface with human resource function	X	X	X
1.5.4. Comply with document and knowledge sharing policy	X	X	X
1.6. Interface with IT sourcing regarding knowledge transfer	X	X	X
1.6.1. Provide a role for relationship & contract management	X	X	X
1.6.2. Define performance/career incentives & penalties		X	X
1.6.3. Clearly define knowledge transfer schedules	X	X	X
1.6.3.1. Backsourcing: define contract termination date		X	
1.6.3.2. Reserve time with knowledge source & receiver		X	
1.6.4. Communicate knowledge transfer plan	X		
1.6.4.1. Business case for knowledge transfer		X	X
1.6.4.2. Future role of knowledge source & receiver		X	
1.6.5. Outsourcing: define future knowledge transfer		X	

Figure 5-24: Consolidated pre-condition requirements

Knowledge transfer performance metrics have been proposed by Szulanksi (Szulanski 1996) and IT sourcing performance is discussed even more frequently (e.g., (Cullen et al. 2006; Hyder et al. 2004a)). However, establishing that document quality and work-performance of the knowledge receiver are seemingly suitable measures for IT sourcing knowledge transfer performance measurement is a new proposition. In contrast, the empirical finding that knowledge items should be defined and an overall alignment with the knowledge transfer inside the larger IT sourcing effort is need was reasonably expected. The need to identify knowledge was already proposed by Mertins (Mertins 2005), though our initial literature review weighted this fact to a lesser degree than, for example, van Donk and Reizebos (van Donk and Riezebos 2005). Furthermore, the assumptions based on existing literature sources and our IT transition research focus, the recommendation of (Szulanski 1999) to address knowledge transfer in a directed manner in addition to suggestion by Stasser et al. (Stasser et al. 1989) to rather work with smaller than with larger groups was confirmed by our field work (final requirement 1.4 and 1.3).

The variety of existing IT sourcing models – notably Cullen et al. (Cullen et al. 2006) and Hyder et al. (Hyder et al. 2004b)– made an alignment a plausible result. Particularly the clearly defined schedules and business justifications were expected from earlier proposals regarding IT sourcing control (Cullen et al. 2006; Feeny and Willcocks 1998; Hyder et al. 2004b; Power et al. 2004; Verhoef 2005; Willcocks and Lacity 2006a), though the IT sourcing business case development assumption was removed as this activity relates more generally to project management. The calls for knowledge transfer control (Davenport et al. 1997; Larsson et al. 1998)– including classical project management (Bresnen et al. 2005; Koskinen et al. 2003) – were also likely, based on the existing research. Similarly, the reference to synchronize knowledge transfer initiatives with the human resource business function was little surprising based on the suggested relationships by Gronau (Gronau 2004) and earlier skill profiling suggestions (Cullen et al. 2006). In contrast the finding that career planning seemingly influences knowledge transfer motivation in IT sourcing initiatives was only marginally reported earlier (Cullen et al. 2006; Tsai et al. 2007), and the finding that penalties and the definition of a future role for the knowledge source are seemingly success related is a new observation from our research. Furthermore, the need to thoroughly communicate any knowledge transfer plan, to reserve dedicated time slots for knowledge transfer and to define required future knowledge transfers at the beginning of an IT sourcing initiative are new suggestions not yet found in the IT sourcing knowledge transfer field.

With regard to our literature based assumptions and constraints we further observed that neither the case study nor the piloting research showed separate roles for relationships and contract management as suggested by the three IT sourcing management models summarized in Figure

3-4. In our observations we found that both roles were executed by one single person. Finally, we posit that an IT sourcing knowledge transfer initiative can and should not establish organizational knowledge management from scratch. On the contrary, an existing knowledge management organization of the knowledge receiving firm should be involved – if it does not exist such a function might need to be established separately. This observation leads us to require to align the knowledge transfer with the knowledge management business function and similarly to adopt its documentation standards and knowledge sharing policies (e.g., which user is allowed to access what knowledge). All three topics, creating a knowledge management business function, establishing documentation standards and defining knowledge sharing policies are covered extensively by literature in the knowledge management field. Both Davenport and Prusak (Davenport and Prusak 1997) and Probst et al. (Probst et al. 1999) provide general frameworks to establish a knowledge organization. A more concrete reference framework has been suggested by Abou-Zeid (Abou-Zeid 2002). With regard to documentation standards many industry specific standards exist today, within the IT field examples include ITIL (OGC 2007) or IEEE Software Maintenance Standards (IEEE 1998) but these are often adapted by the adopting organization. Regarding knowledge sharing, indicative research on how knowledge access policies may be structured has been proposed by Gray (Gray 2001) in reference to the power impact of shared knowledge. To address IT support tools particularly Gottschalk (Gottschalk 2005) as well as Ackerman et al. (Ackerman et al. 2002) provided an extensive list of possible uses and requirements for IT systems supporting knowledge management. Our own IT support findings therefore merely underline the importance and highlight seemingly adequate tools found useful in IT sourcing knowledge transfers in particular.

5.3.2 Principle requirements

In order to address the topic of knowledge-sharing policy (Hyder et al. 2004a), we established governing principles for the knowledge transfer method in IT sourcing initiatives from both research streams resulting in well defined method principles. The results were much more detailed than in our literature survey (see Figure 5-25).

Final requirement item		Case study	Piloting	Literature
2.	2.1. Trust in the skills of knowledge transfer participants	X	X	X
	2.1.1. Trust based on professional acceptance	X	X	X
	2.1.2. Trust developed during continuous joint work	X	X	X

Final requirement item	Case study	Piloting	Literature
2.2. Control over knowledge transfer progress	X	X	X
2.2.1. Control to be conducted by knowledge receiver firm		X	
2.2.2. Contract clauses to control knowledge source firm		X	
2.2.3. Control quality of progress (measures see 1)		X	
2.2.4. Continuous control		X	
2.3. Structured and methodological process	X	X	X
2.4. Transparent process execution	X	X	X
2.5. Participatory teamwork with shared goals	X	X	X
2.5.1. Clearly defined responsibilities with small overlap	X	X	
2.5.2. Knowledge receiver does the work at earliest possible		X	
2.5.3. Knowledge source supports receiver transparently		X	
2.5.4. Third party balances source and receiver interaction		X	
2.6. Motivation of knowledge transfer participants	X	X	X
2.6.1. Financial incentives	X	X	
2.6.2. Career advancement	X	X	
2.6.3. Symmetrical extend of incentives		X	

Figure 5-25: Consolidated principle requirements

Regarding the trust requirement (final requirement 2.1), we were able to observe that it was related to relationship-specific trust, and therefore trust develops over time and is not related to benevolence in the context of IT sourcing knowledge transfer. We were able to find two, more detailed, final trust requirements. The professional acceptance (final requirement 2.1.1) suggested by McKnight et al. (McKnight et al. 1998) and Ko et al. (Ko et al. 2005) proved adequate for the IT sourcing field, despite our initial critique. Therefore, some acceptance regarding skills of the knowledge source and receiver is considered helpful. The second discovery was that effective trust had to be developed over time (final requirement 2.1.2), much in line with suggestions by Ring and Ven (Ring and Ven 1992). In addition, the literature-based claim (e.g., (Davenport et al. 1997), (Larsson et al. 1998), (Feeny and Willcocks 1998; Power et al. 2004), (Verhoef 2005), (Gellings 2007)) of controlling knowledge transfer similar to other IT sourcing tasks was confirmed by our case study and piloting research. Thought, this finding is in conflict with the psychological contract perspective (Koh et al. 2004), we find that control can bolster trust, as proposed by (Goo and Na 2007), if established trough contracts and if these allow the build-up of trust to take place (Malhotra and Murnighan 2002; Zaheer et al. 1998). This finding is likely to help in establishing professional acceptance based trust since more formal aspects can be described in contracts to seed the trust build-up process – including trainings required until skills are at an acceptable level.

New observations with regard to IT sourcing knowledge management include our findings on which contracting party and when best carries out the control and where any targets are best specified. The piloting research revealed four detailed final requirements (final requirement items 2.2.1, 2.2.2, 2.2.3 and 2.2.4). First of all, the knowledge transfer control function should be carried out by the knowledge receiving firm. The knowledge transfer control targets (compare prerequisite requirements above) being employed are best specified along other IT sourcing targets in the sourcing contract. Finally, periodic control intervals help to track the knowledge transfer progress.

The assumption, based on the previous suggestion regarding knowledge transfer process structure by Szulanski (Szulanski 1999) and other IT sourcing models (Cullen et al. 2006; Hyder et al. 2004b; Paulk et al. 2005), that a structured and methodological knowledge transfer process is required was confirmed (final requirement 2.3).

Evidence supporting an open and transparent knowledge transfer process (final requirement 2.4) was found in the case study and piloting research. The findings supported literature suggesting to reduce uncertainty and ambiguity of knowledge transfer initiatives in general (Szulanski 1996). In addition, reducing ambiguity in inter-firm knowledge transfer initiatives was already proposed by Simonin (Simonin 1999).

The original participatory principle became more detailed in the process of our piloting study (final requirements 2.5.1, 2.5.2, 2.5.3 and 2.5.4). While teamwork aspects (e.g., shared goals) were already emphasized by Levina and Ross (Levina and Ross 2003) and Stasser et al. (Stasser et al. 1989) suggesting small rather than large knowledge transfer teams, the case study and piloting research uncovered additional aspects particular to knowledge transfer in IT sourcing initiatives. It became apparent that responsibilities had to be clearly defined and responsibility overlaps minimized between knowledge source and receiver (final requirement item 2.5.1), in time as well as in scope. In addition, such responsibility overlaps have received remarkably little attention by researchers[72]. The research stream most closely related is the one of task design focusing on responsibility, a field classically covered by Drucker (Drucker 2007) – continued by Crowston (Crowston 1997) to include information systems into the analysis. Furthermore, it was found that the knowledge receiver preferably does as much of the actual knowledge transfer work as early as possible, starting with the documentation. This represents an important contribution since some sources proposing knowledge sharing and collective action (e.g., (Burgess 2005; Wasko and Faraj 2005)) may lead a reader to assume that responsibilities should be shared between the two parties. This does not appear to be the case. Finally, we discovered that moderation of knowledge transfer activities is frequently required, an observation that has currently not been proposed by other sources in the field of IT sourcing knowledge transfer. In particular the moderation should be focused on two areas. First, one moderator should balance any knowledge source and knowledge receiver differences. Second, the knowledge source should moderate or coach the knowledge receiver, when needed. Upon investigating the subject of coaching in a broader context, we find that Leonard and Swap (Leonard and Swap 2004) suggested using a coach to facilitate management training in general.

Motivational aspects, positive and negative ones, were supported by both of our research efforts. The case studies revealed that financial and career incentives have been used in combination (final requirement items 2.6.1 and 2.6.2) which is in line with some previous recommendations (Burgess 2005; Wasko and Faraj 2005). Our contribution to this is the finding from the field, that career incentives are relatively more effective, especially in motivating the knowledge source. The piloting research further more revealed that the incentives, at least the ones easily comparable by employees, such as financial incentives, should be equal in volume (final requirement item 2.6.3).

5.3.3 Procedure model requirements

With regard to the procedure model, very few literature derived assumptions and constraints remained entirely as specified in section 3.3. In fact, since the procedure model governs the activity execution sequence, the procedure model requirements had to be adapted to match resulting knowledge transfer activities and other method element specifications discovered during our research (see the activities final requirements 6.1 and 6.2). This observation was published earlier by Voigt et al. (Voigt et al. 2007a) and describes the synchronization points between IT sourcing activities and knowledge transfer activities (final requirement 3.7) – see following Figure 5-26.

[72] A review of Organization Science on the subject of "responsibility overlap" did not turn up any conclusive research on the matter.

	Final requirement item	Case study	Piloting	Literature
3.	3.6. Synchronize with organizational knowledge management		X	X
	3.6.1. Synchronize after preparation activity with knowledge distribution		X	X*
	3.6.2. Synchronize during implementation stage with knowledge acquisition		X	X
	3.7. Synchronize with IT sourcing step	X		X
	3.7.1. Synchronize knowledge identification before and after design or select sourcing step	X		X*
	3.7.2. Synchronize knowledge transfer planning before and after the select sourcing step	X		X*
	3.7.3. Synchronize knowledge transfer implementation stage during transition sourcing step	X		X*
	3.7.4. Synchronize knowledge transfer control after transition sourcing step	X		X*
	3.8. Sequence of activity execution			X
	3.8.1. Start with the planning stage (see final requirement 6.1)	X	X	
	3.8.2. Continue with the implementation stage see final requirement 6.2)	X	X	

*Literature allowed identification of synchronization points, but not which of the knowledge transfer activities were executed.

Figure 5-26: Consolidated procedure model requirements

The knowledge transfer activities mentioned in final requirements 3.7.1 to 3.7.4 refer to the activities proposed by our research, while the IT sourcing steps mentioned are based on Cullen et al. (Cullen et al. 2006). The actual sequence of knowledge transfer activities (final requirements 3.8) follows the sequence proposed by Szulanski (Szulanski 1999). Following Szulanski's model we posit that any planning activities (e.g., knowledge identification or planning) need to be completed before entering the knowledge transfer implementation phase. In an IT sourcing context these planning activities are typically performed prior to or during the selection of a vendor according to Voigt et al. (Voigt et al. 2007a) – An exception may be any adjustments done based on the negotiation outcome. In addition, the activities and their design are also part of our contribution to the IT sourcing knowledge transfer field. One of these activities, the knowledge transfer control activity mentioned in (final requirement 3.7.4), however, refers to the responsibilities of the knowledge transfer program office (see role model final requirement 4.2.1) to verify that a planned knowledge transfer was executed according to plan and achieved its intended goal. The activity is therefore not specified elsewhere. Finally, the synchronization of knowledge transfer activities with a firms knowledge management process is based on the framework by Probst et al. (Probst et al. 1999) and was only observed during our case study research. The firm where piloting was carried out did not use a formalized knowledge management organization. We chose the Probst et al. model over a model proposed by Nonaka and Takeuchi (Nonaka and Takeuchi 1995) because Nonaka and Takeuchi are more concerned with knowledge creation than with knowledge management as an integrated management process.

5.3.4 Role model requirements

The final requirements regarding the role model were superficially supported during the case study research but considerably extended during our pilot research. While the case study research only provided two additional roles (final requirement item 4.2.2 and 4.3.4), the piloting research contributed seven new roles (final requirement items 4.2.1, 4.2.3, 4.2.4, 4.2.5, 4.3.1, 4.3.5 and 4.3.6) and more detailed responsibilities and duties for each role.

Final requirement item		Case study	Piloting	Literature
4.	4.1. Managing roles		X	
	4.1.1. Knowledge transfer sponsor	X	X	
	4.1.1.1. Duty: sourcing contract & knowledge transfer		X	X
	4.1.2. Program manager	X	X	X
	4.1.2.1. Duty: coordinate knowledge transfers		X	
	4.2. Supervising roles		X	
	4.2.1. Program office		X	
	4.2.1.1. Duty: control & measure knowledge transfers		X	
	4.2.2. Supervisors knowledge receiver	X	X	
	4.2.2.1. Duty: manage knowledge receiver		X	
	4.2.3. Project manager knowledge transfer		X	

Final requirement item	Case study	Piloting	Literature
4.2.3.1. Duty: manager of knowledge source & receiver		X	
4.2.4. Activity specialist knowledge identification		X	
4.2.4.1. Duty: consolidate knowledge identification		X	
4.2.5. Activity specialist moderator		X	
4.2.5.1. Duty: Moderate reflection activities		X	
4.3. Operating staff		X	
4.3.1. Knowledge transfer coach		X	
4.3.1.1. Duty: assist with knowledge management policy		X	
4.3.2. Knowledge receiver	X	X	X
4.3.2.1. Duty: acquire knowledge and ask for it	X	X	
4.3.3. Knowledge source	X	X	X
4.3.3.1. Duty: provide knowledge and support		X	
4.3.4. Supervisor knowledge source	X	X	
4.3.4.1. Duty: manage source firm aspects and contract		X	
4.3.5. Other employees knowledge receiving firm		X	
4.3.5.1. Duty: identify knowledge & deputy receiver		X	
4.3.6. Assistant and technical writer		X	
4.3.6.1. Duty: Write protocol, check documents		X	

Figure 5-27: Consolidated role model requirements

The roles of knowledge source and knowledge receiver are implied by many sources (e.g., (Levin and Cross 2004; Szulanski 1996; Tsai 2001; Yang and Kim 2007). Furthermore, the knowledge transfer program manager has been suggested by Cullen et al. (Cullen et al. 2006). In contrast, other roles, while seemingly required by general project management frameworks, have been mentioned very rarely. One role we discovered retrospectively was the knowledge transfer coach proposed by Leonard and Swap (Leonard and Swap 2004). In addition, we were able to identify sources suggesting the duties of a knowledge transfer sponsor (Bourn 2000). Other than this, the roles listed in Figure 5-14 represent our recommended choice of roles and their duties based on piloting and case study research. While some of these roles may be derived from general project management, our contributions are the description of effective duties and organization during the knowledge transfer.

With respect to the overall assignment of roles to employees our piloting research revealed a more practical organization than initially suggested by our assumptions in chapter 3.3. Our research suggests that each of the managing and supervising roles (final requirement items 4.1, 4.2 and 4.3) could be carried out by one single person in smaller knowledge transfer efforts. Therefore, requiring only one supervising employee and one managing employee. However, the operating roles knowledge source, knowledge receiver and knowledge source supervisor were found to be essential. This reduces the absolute minimum number of people involved to five. Furthermore, we observed during our piloting research that the knowledge transfer source was best placed under the leadership of the knowledge transfer project manager role for the duration of the knowledge transfer (final requirement item 4.2.3.1). Of the original assumptions and constraints, we changed the committee role to a knowledge sponsor role (final requirement item 4.1.1) and neglected the knowledge management liaison role assumed to be required. The knowledge management liaison role has not been directly observed to be a part of knowledge transfer, but a role separately placed with the knowledge management organization. Therefore, this role is already accounted for in the preconditions of the knowledge transfer method (final requirement item 1.5.1).

5.3.5 Information model requirements

The case study research, while indicative regarding the information model, provided relatively little conclusive evidence regarding which documents and what content they should have in an IT sourcing knowledge transfer initiative. However, since the piloting research forced us to produce relevant and practical documents we were able to discover much more detailed final requirements (see Figure 5-28).

	Final requirement item	Case study	Piloting	Literature
5.	5.1. Precondition checklist		X	
	5.2. Knowledge item catalog consisting of	X	X	X
	5.2.1. Information resource		X	
	5.2.2. Human resource unit		X	
	5.2.3. Knowledge item		X	

Final requirement item	Case study	Piloting	Literature
5.2.4. Knowledge area		X	
5.2.5. Knowledge transfer identifier		X	
5.3. Knowledge transfer program		X	
5.3.1. List of knowledge identifier and their status		X	
5.4. Knowledge transfer manifest	X	X	X
5.4.1. Document knowledge transfer participants and roles	X	X	X
5.4.2. Document knowledge transfer schedule	X	X	
5.4.3. Knowledge transfer risk analysis		X	
5.4.4. Knowledge item specification[1]		X	
5.4.5. Sign transfer manifest by all participants	X	X	X
5.5. Design documentation		X	
5.6. Review of documentation and work performance		X	
5.7. Documentation of work experience reflections		X	

1 Often a separate document during the planning process but later incorporated into the knowledge transfer manifest

Figure 5-28: Consolidated information model requirements

The first required document, the precondition list (final requirement 5.1), emerged out of practical consideration. Many knowledge transfer pilots started without providing necessary support. Such ill-supported initiatives are far more likely to fail and checking the required precondition prior to a knowledge transfer initiative reduces the failure risk.

The emergence of a knowledge item catalog (final requirement 5.2) was already suggested by Mertins (Mertins 2005). However, a useful structure as described by the final requirements 5.2.1 to 5.2.5 is new within the IT sourcing field, especially with regard to knowledge transfer. This holds despite the earlier contributions of Abecker et al. (Abecker et al. 1998) to the field of intelligent systems, later resulting in more formal ontology engineering methods (Gomez-Perez et al. 2005; López 1999; Maedche et al. 2003; Niemann 2005; Staab and Studer 2006). While ontology engineering serves an important role when modeling knowledge in a machine readable structure, knowledge models for knowledge transfers between humans can afford a less detailed description. Humans are more easily capable of spontaneous question formulation to retrieve missing information from the knowledge source. At least this holds in our setting of IT sourcing, given a transition phase, where the knowledge receiver is required to take over duties from the knowledge source, and thus will need to ask the knowledge source as soon as he or she has to perform a task he or she does not know how to do.

Many of the documents originally assumed during the literature review to be important became a part of the final requirements but got assigned to different requirement categories. The future organization in terms of a future organization chart – derived from the suggested documentation of retained organization and personal structure (Cullen et al. 2006; Hyder et al. 2004a)- was focused on the future roles of the knowledge receiver and the knowledge source. In consequence, this assumption became a part of the final precondition requirements (final requirement item 1.6.4.2). Similarly, the broader documentation, suggested by Zander, Kogut and Argote (Argote 1999; Zander and Kogut 1995) and knowledge policy assumption was moved from the information model to become a final requirement of the preconditions (final requirement item 1.5.4). Even though, the more specific observation for design documentation (final requirement 5.5) and knowledge item specification (final requirement 5.4.4) remained with the information model. Furthermore, some of the planning-related documents proposed in previous research were rejected based on our case study findings. While many cases supported knowledge transfer planning – resulting in the knowledge transfer manifest (final requirement 5.4 and 5.4.2) - in several ways, we did not find knowledge receiver or source profiling as useful during our piloting research as proposed by several authors (Cullen et al. 2006; Hyder et al. 2004a). Only partial profiling data was deemed necessary for optional risk analysis (final requirement item 5.4.3). However, the same authors proposition to clearly document knowledge transfer stakeholders (Hyder et al. 2004a), and to demand a cooperation agreement among them (Mathew et al. 2007) – listed as item 5.5 and 5.6 respectively 5.9 in Figure 3-12 – resulted in critically important information model requirements (final requirement 5.4 as well as 5.4.1 and 5.4.5). Finally, the requirement to review documentation and work performance in a documentable manner as well as to archive experiences – particularly those of the knowledge source – are rooted in more general project management guidelines, yet we contribute that these documents cannot be easily omitted in a successful IT sourcing knowledge transfer.

The majority of the documents found to be required were only discovered during our piloting research (final information model requirements are based on a single piloting research source). For clarity, each document section or content we could identify in our research was grouped into the document it is meant to be contained in or applied to, listed as second order list item in Figure 5-28. While the planning documents (final requirement 5.2, 5.3 and 5.4) resulted to be rather specific, other documents remained with much less detailed requirements. Specifically, documentation-related documents (final requirement 5.5, 5.6 and in part 5.7) are often very firm specific, governed by the knowledge sharing and documentation policy of the firm. Therefore we refrained from specifying these any further in terms of requirements. Although, chapter 6 will reference specific documents, these may or may not be applicable in general, as they have also been tailored in part to one company's documentation policy. The contribution of listing these documents is that these documents have to be produced in the course of a knowledge transfer initiative in an IT sourcing context. In part, these documents are in line with the activities we were able to observe, since often, these activities required the aforementioned documents as final or interim results. Our contribution to the IT sourcing knowledge transfer field therefore is a consistent and sufficient information model. In addition, we propose detailed features of the documents required by the information model.

5.3.6 Activities and result requirements

Activities- and results-related final requirements are described together for reasons of clarity. Since each activity yields a certain set of results, we chose to describe the activity requirements including the required results. Therefore we will not present separate final requirements for results and activities, but present both method elements in on set of final requirements. In addition, since activities use techniques, we will reference some literature, assumptions and constraints related to techniques from our initial literature study. While the assumptions and constraints proposed in chapter 3.3 already contained indications regarding many of the final requirements below, they could not reveal any specific action to successfully carry-out knowledge transfer. Precisely these actions could only be observed in sufficient detail during our piloting research intervention. The following Figure 5-29 groups each activity into their respective stages and lists their required actions within each activity.

Final requirement item		Case study	Piloting	Literature
6.	6.1. Planning stage			
	6.1.1.Knowledge identification	X	X	X
	6.1.1.1. Collect role information		X	
	6.1.1.2. Collect business process/design information		X	X
	6.1.1.3. Document analysis of collected information		X	
	6.1.1.4. Consolidate information in teams		X	
	6.1.1.5. Assign knowledge item identifier & area		X	
	6.1.1.6. Assign synonym and short descriptions		X	

Final requirement item	Case study	Piloting	Literature
6.1.1.7. Team supervisors assign transfer urgency		X	
6.1.1.8. Executives assign strategic importance		X	
6.1.1.9. Consolidation with supervisors & executives		X	
6.1.1.10. Result: Knowledge item catalog (see final requirement item 5.2)	X	X	
6.1.2.Knowledge transfer planning	X	X	
6.1.2.1. Establish knowledge transfer schedule		X	X
6.1.2.2. Establish performance targets for schedule		X	X
6.1.2.3. Estimate knowledge transfer resources		X	
6.1.2.4. Assess knowledge transfer risks (optional)		X	
6.1.2.5. Ensure future career path of knowledge source		X	
6.1.2.6. Ensure comparable incentives for participants		X	
6.1.2.7. Review draft manifest with participants		X	
6.1.2.8. Organize information & signing event		X	X
6.1.2.9. Result: Knowledge transfer manifest (see final requirement item 5.4)	X	X	
6.1.2.10. Optional 6.1.2.9: knowledge transfer program (see final requirement item 5.3)		X	
6.2. Implementation stage			
6.2.1.Self-study	X	X	X

Final requirement item	Case study	Piloting	Literature
6.2.1.1. Documentation knowledge receiver prepared		X	
6.2.1.2. Documentation template provided by source		X	
6.2.1.3. Optional 6.2.1.2: Documentation template provided by receiver knowledge policy		X	
6.2.1.4. Knowledge source comments receiver indirectly		X	
6.2.1.5. Knowledge receiver requests knowledge		X	
6.2.1.6. Result: Design documentation (see final requirement 5.5)			
6.2.2. Tandem	X	X	X
6.2.2.1. Three stage responsibility handover		X	
6.2.2.2. Keep learning diaries to reflect on learning experience		X	X
6.2.2.3. Indirect knowledge transfer monitoring through learning diaries		X	
6.2.2.4. Result: Performance target achievement recorded in knowledge transfer program			
6.2.3. Ad hoc reflection		X	X
6.2.3.1. Empower additional deputy knowledge receiver		X	
6.2.3.2. Perform directly after task		X	
6.2.3.3. Reduce hierarchical friction by explicit act of striping rank		X	X
6.2.3.4. Focus on best practices, not error avoidance		X	X
6.2.3.5. Moderated workshops to get consensus		X	X

Final requirement item	Case study	Piloting	Literature
6.2.3.6. Allow free question answering	X	X	X
6.2.3.7. Result: Documentation of experiences (see final requirement 5.7)		X	
6.2.4. Project reflection		X	X
6.2.4.1. List of improvement measures		X	
6.2.4.2. Perform directly after project		X	
6.2.4.3. Moderated workshops to get consensus		X	X
6.2.4.4. Allow free question answering	X	X	X
6.2.4.5. Result: Documentation of experiences (see final requirement 5.7)		X	

Figure 5-29: Consolidated activity and result requirements

While the empirical results yielded much more detail than the literature study, some of the final requirements were mentioned. According the to the previous argument on the information model, the knowledge item catalog was already reported by Mertins (Mertins 2005) and the specific activity to identify knowledge was briefly mentioned by (Probst et al. 1999). In addition, Venkatesan (Venkatesan 1992) mentioned a structured process to identify work that could be outsourced and therefore already suggested a way to identify core knowledge. Similarly, our idea to seed (i.e., bootstrap) the knowledge identification activity with business process or product design information (final requirement 6.1.1.2) originates in Venkatesan's work. Other observed requirements were less clearly related to IT sourcing knowledge transfer by previous research. While consensus finding (final requirements 6.1.1.4, 6.1.1.7, 6.1.1.8, 6.1.1.9) was found to serve effective decision making in groups (Schweiger et al. 1986). The actual consolidation technique was proposed by group decision system research employing similar techniques used to reconcile different opinions (Watson et al. 1988). The particular sequence of actions proposed by our pilot research suggest that neither top-down nor bottom-up definition of knowledge items works best, but a mix of both: collecting strategic goals and matching these with operating needs in a "sandwich" approach. Yet other requirements concern simply administrative aspects (final requirements 6.1.1.1, 6.1.1.5 and 6.1.1.6) to avoid duplicates and ensure mutual understanding. Finally, the observed need to collect and analyze document related to the knowledge transfer (final requirement 6.1.1.3) best matches techniques described by Dixon (Dixon 2000) being used at British Petroleum and Ernst & Young.

The second activity, knowledge transfer planning, resembles many actions generally related to project management (compare (Duncan 1996)). However, we contribute the specific observations to the IT sourcing knowledge transfer field in order to highlight which general project management actions are useful and which need special attention in planning a knowledge transfer successfully. A need to establish a defined schedule for the knowledge transfer (final requirement item 6.1.2) in IT sourcing settings derives from the suggested IT sourcing process of Cullen et al. (Cullen et al. 2006). Similarly, the need to establish performance targets (final requirement 6.2.2) was not only observed during our field work, but suggestions of knowledge goals and knowledge evaluation activities were already discussed by Probst (Probst et al. 1999). In addition, these two requirements are in line with the method principles to structure and control the overall knowledge transfer initiative. Furthermore, optionally assessing the knowledge transfer risks and to perform a final review are actions, while mentioned in general project management sources, that are a unique contribution of our pilot research to the IT sourcing knowledge transfer field. The observation asserts that consensus is required and that reviews need to be conducted for reasons of completeness and to seek agreements among the knowledge transfer participants – in contrast to directing knowledge transfer top-down only. Optionally assessing knowledge transfer risks may help to avoid failures.

With regard to motivation, we propose that incentives must be structured in a particular manner to be reasonably effective (final requirement item 6.1.2.5, 6.1.2.6). The knowledge transfer planning is the activity where the motivation related method principles are defined and agreed. We observed adverse effects on knowledge transfer when the knowledge source faces an undefined future with the firm or the salary levels of the knowledge source and knowledge receiver deviated significantly. Therefore, we propose to carefully design these two incentives as part of the knowledge transfer planning activity. Finally, we observed that commitment to the knowledge transfer increases once the participants offer a token of consent in terms of signing a document (final requirement 6.1.2.8). Organizing a dedicated meeting, ideally with a knowledge transfer sponsor present, was perceived to be a good way to achieve the required commitment, even if the document stopped short of a formal contract. Such an event relates strongly to the transparency method principle mentioned in the beginning and is anecdotally related to the good communication of knowledge transfers proposed by Hyder et al. (Hyder et al. 2004a).

Concluding with the knowledge transfer planning activity the procedure model we are proposing recommends to finish the planning stage (final requirement 6.1) and to start with the second stage, implementation (final requirement 6.2). This structure partly relies on the method structure and control principles. First, it summarizes the four knowledge transfer phases originally proposed by Szulanski (Szulanski 1999). Second, the activities are designed to follow each other as well as to sequentially execute each of the listed tasks. This allows tracking the progress by simply noting which tasks of an activity are still not completed. In addition, this structure allows the first stage of the knowledge transfer to be more easily integrated into the overall IT sourcing select phase, and the second stage to be integrated into the transition phase (Cullen et al. 2006) - also compare Figure 5-26.

The activities grouped into the implementation phase all describe useful activities, but not all of them may be required for a successful knowledge transfer. Therefore the order of appearance in Figure 5-29 is not strictly required, though it has proven useful during our pilot research, and one or more of these activities might be omitted or executed in parallel. We are able to propose a collection of four implementation stage activities for an IT sourcing knowledge transfer – more activities may be suitable, but these represent the ones we did observe. Our observation confirmed the need for an individual, largely document based, study period (final requirement 6.2.1). In addition, we discovered that a defined set of documents, similar to knowledge assets or power packs (Dixon 2000), were the best work product of such a study period. In contrast to previous reports of this activity we contribute a new approach. We propose to rather have the knowledge receiver write any documents and the knowledge source to contribute through feedback cycles. This approach showed two primary benefits. First, the resulting documentation would be sufficiently comprehensible for other knowledge receiver (Hinds et al. 2001), and second can appeal to the knowledge source expert status. Finally, we propose to focus on design (i.e., intermediate abstract documentation) documentation since it was reported being the best trade-off between future re-use value and level of detail during our pilots.

Moreover, we propose to summarize a variety of techniques into a single activity we refer to as tandem (final requirement 6.2.2). Based on our piloting observation we propose to structure the activity along responsibility handover in three phases (final requirement 6.2.2.1):

- Knowledge source is responsible and knowledge receiver observes.
- Knowledge source is responsible but the knowledge receiver performs a knowledge transfer related task.
- The knowledge receiver becomes responsible and the knowledge source observes.

The first stage is best described by learning-before-doing (e.g., compare (Chini 2004)), the second stage is similar to learning-by-doing (e.g., compare (Chini 2004)) and the last stage is modeled against classic mentoring, particularly buddy support (e.g., compare (BCG 2007; Dixon 2000)). During all stages we recommend that the knowledge receiver documents his or her learning experiences (final requirement 6.2.2.2) in learning diaries (Kleiner and Roth 1997). In addition, the knowledge source best observes the knowledge transfer progress through either defined document reviews or through learning diary reviews to limit the risk of patronizing the knowledge receiver (final requirement 6.2.2.3). Typically the tandem activity is performed before the ad hoc or project reflection.

Finally, even though we set out to develop a method for dyadic knowledge transfers, we observed a need of the field to perform at least some group knowledge transfer activities – Even through primarily for the benefit of the knowledge receiver. From knowledge management perspective this need can originate in increased motivation. Reagans and McEvily (Reagans and McEvily 2003) suggested that motivation for knowledge transfer may increase if conducted in a group. In addition, once the former knowledge receiver has to transfer some knowledge as well, the reflection on what he or she already knows may deepen his or her understanding of the matter (Schön 1987). An organizational reason for such group diffusion of knowledge can result from hedging against the knowledge loss if as single key employee leaves or forgets details, as has been described by Darr et al. (Darr et al. 1995). The primary activity we propose for such a knowledge transfer, most likely taking place late into a transition or even within the operating phase of an IT sourcing, is an adoption of the after action review described by Darling et al. (Darling et al. 2005), ad hoc reflection (final requirement 6.2.3). The after action review activity requires a relaxed (final requirement 6.2.3.3), open (final requirement 6.2.3.6) and improvement focused environment (final requirement 6.2.3.4) to be established directly after a work engagement (final requirement 6.2.3.2). Important considerations with regard to this are hidden profiles described by Stasser (Stasser and Titus 2003) and research by psychologists that groups are better at recalling knowledge (Hinsz 1990), as well as that repeated interaction in groups may eventually result in shared information (Larson et al. 1994). These requirements were confirmed by our empirical observation, but a second adaptation was required. While the after action review served well in principle, conducting the activity directly after a work engagement did not make sense in all cases. Therefore, we propose a second activity, project reflection, that differs in the timing of its execution and is closely related to post-project reviews proposed for research and development projects by von Zedtwitz (von Zedtwitz 2002).

This concludes our review of the requirements for a knowledge transfer method in IT sourcing contexts. The following chapter will now turn to a practical implementation of the requirements presented above.

6 Exemplary knowledge transfer method description

The method presented in this chapter represents an exemplary knowledge transfer method for IT sourcing initiatives designed against the abstract requirements collected and presented in the previous chapter (hence forward "The Method"). The presented method is an analogous German to English translation of the final version of a knowledge transfer method implemented and accepted by our sponsor firm[73]. The presented method is therefore the product of numerous reviews (see chapter 7) and feedback cycles. Therefore, this is not the method version employed in any of the pilots being studied (the first piloting phase used no formal method, and the second piloting phase used a previous method version), but an enhanced second version of the method. This method presentation is written for practical use, detailed references and discussions are provided in chapter 5.3. While the text will reference the requirements developed previously, some aspects cannot be linked to generalizable observation but have to be included due to organizational requirements to make the method work in a practical setting. Some of these merely rely on single case observations, where possible we provide a short related research abstract after each method component. Although the method description is translated, work-sheets, templates and references may not be translated and are only included in German in the appendix.

6.1 Overview of The Method

Section 6.1 will provide an overview of the usage, purpose and method elements of The Method. This presentation follows the proposed structure of method elements described in chapter 2.1. The reader will also be introduced to the synchronization of The Method and the IT sourcing process. In section 6.2 the reader will find conceptualized aspects of The Method.

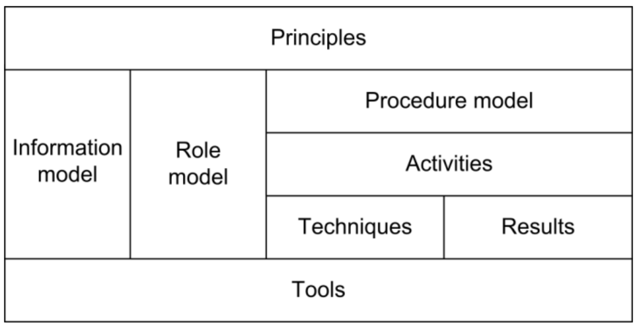

Figure 6-1: Constituent elements of The Method

[73] Slight modifications have been made to the overview section to match with the conceptualized vocabulary used through this thesis. In addition, the principle section of the method components have been removed and a related research section has been added.

The Method is structured into eight elements: principles, information model, role model, procedure model, activities, techniques, results and tools. The Method presentation will describe each of these elements in detail in the following section (section 6.2). The remainder of the presentation (section 6.3 to 6.8) will present a set of configurations of these elements in terms of individual method components. The method components combine each of the elements to one consistent structural element and follow a defined structure as described in section 6.2.4.2. Section 6.2 in general will describe method components, their order of execution and governing principles, the overall organization of a knowledge transfer initiative as well as the measures and activities to execute them, including preconditions to meet prior to starting with any knowledge transfer according to this method. Finally, the guidelines on how to extend The Method will be introduced (section 6.2.5).

The text will reference the knowledge transfer method requirements for IT sourcing initiatives presented in chapter 5.3. Each of these final requirements will be presented in round brackets where applicable. The format will entail an abbreviation for the final requirement (FR) followed by the number of the relevant final requirements listed in chapter 5.3.

6.1.1 Introduction

The Method describes a series of activities to be executed in the context of IT outsourcing or IT backsourcing initiatives. The activities are intended to facilitate the knowledge transfer between the two parties in such a context. Whenever either IT outsourcing or IT backsourcing are referenced, we will refer to the term IT sourcing.

6.1.2 Target audience

The target audience for The Method is the project manager, program manager and coach interested in practical guidance for knowledge transfer in IT sourcing initiatives. The following text presents the complete documentation of the guidance. Selected parts of the text may be used to inform any knowledge transfer participant regarding the knowledge transfer initiative (i.e., as part of a reader in preparation for a knowledge transfer). The method may be extended by additional method elements not presented in the text. Guidance of extending the methods is presented as part of the following section.

6.1.3 Purpose and usage of The Method

The Method is equally meant for IT outsourcing and backsourcing initiatives. This is possible, since the same activities have to be executed in either initiative. Independent of the IT sourcing direction, either party has to receive some knowledge about the other parties' IT systems.

Though some aspects will be particular to the IT outsourcing scenario and some will only apply to the IT backsourcing scenario. In the case of backsourcing (FR 1.6.3.1), the design of the future sourcing scenarios will have to consider the existing IT sourcing contract. In the case of an IT outsourcing scenario (FR 1.6.5) managing the contract of existing employees appropriately will be one important aspect. The Method does not provide guidance regarding these contractual or personnel-related aspects. In fact, the method will ask for preconditions (FR 1 - 1.6) to be met prior to starting any knowledge transfer as outlined through The Method.

Furthermore, The Method does not provide guidance regarding knowledge storage or knowledge dissemination within the knowledge receiving firm. Guidance regarding these activities is best provided through knowledge receiving firm's knowledge management organization. The method will reference certain knowledge management functions (FR 1.5) wherever it seems appropriate. However, these references cannot be taken as substitutes for an organizational knowledge management policy. In addition, The Method does not provide directions for continuous knowledge transfer (FR 1.4) during an IT sourcing relationship. It is up to the IT sourcing participants to determine the frequency and content of repeated knowledge transfers within their IT sourcing framework contract. If repeated knowledge transfers are expected (e.g., when production technologies are changed by the supplier or if the customer requests new products to be produced) in the course of an IT sourcing relationship, The Method may contribute some helpful suggestions.

The Method is intended for knowledge transfer between independent organizations. In the course of preparing a plan for transitioning services from a source organization to a receiving organization, The Method supports this process by identifying relevant knowledge (FR 1.2). In the following operation phase of the IT sourcing cycle, The Method offers various options for conducting knowledge transfer between the contracting parties.

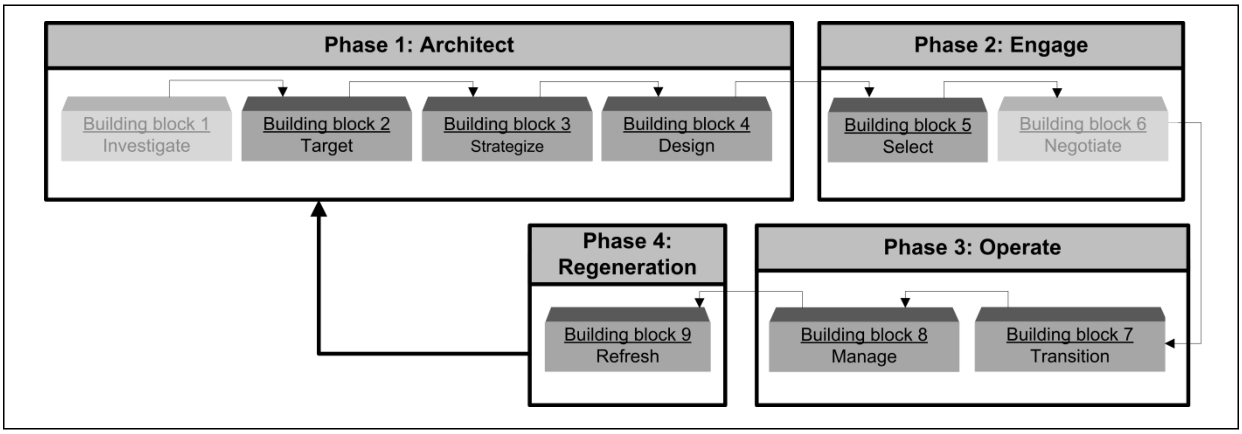

Figure 6-2: Building blocks in IT sourcing cycle relevant to knowledge transfer

The previously mentioned support extends across several IT sourcing cycle building blocks (FR 1.6 , 3.7). The building blocks not involving knowledge transfer activities are shaded in Figure 6-2. First, the results of the target service analysis (building block two) and the skill analysis (building block three) are integrated into the knowledge identification activities (FR 3.7.1). Second, the identified knowledge in turn influences the feasibility, impact analysis and business case development (building block three) (FR 1.6.4.1). Additionally, the knowledge transfer communication is integrated into the IT sourcing communication activities (building block three) (FR 1.6.4). Third, the knowledge transfer planning, knowledge transfer progress measurements (FR 1) and milestones will become part of the overall IT sourcing scorecard and possibly the draft contract (building block four) (FR 3.7.1). Furthermore, the identified knowledge source and knowledge receiver influences the design of the retained organization at the IT sourcing source firm (building block four) (FR 1.6.1). On the other hand, The Method benefits from a well defined plan (FR 1.6.3) of the IT sourcing initiative's future organization (FR 1.6.4.2), which should result from the IT sourcing architecture phase. Finally, in the case of an IT outsourcing initiative, the selection of a proper target firm, e.g., IT sourcing vendor, the selected knowledge items to be transferred become part of the bidding package and become subject to validation in the due diligence process (building block five) (FR 3.7.2). A backsourcing scenario would not require such a step, since the target firm will usually be set to be the former client. In addition, a potential target firm may use part of the knowledge identification activities during the due diligence to validate the information in the bidding package and to refine their offer (building block five). Furthermore, an IT sourcing buyer will evaluate offers against any of the chosen evaluation criteria, including the time, cost and quality of knowledge transfer (FR 3.7.2).

Once the IT sourcing contract negotiations have been concluded and a contract has been signed, The Method aims to facilitate the transfer of knowledge during the operation phase more rapidly and according to controllable milestones (FR 2.2, 1). According to the knowledge transfer planning activities the knowledge transfer will be planned and become an integral part of the transition plan (building block seven) (FR 1.6.2, 3.7.3). Therefore knowledge source and knowledge receiver employees will become part of the transition team (building block seven) (FR 1.6.3.2). The actual knowledge transfer process will be supported by the individual implementation stage method components of The Method (building block seven). The target and performance measurement (FR 1) will be controlled through the program office role and can be integrated into the risk management and reporting of the entire IT sourcing initiative (FR 1.6.1).

With regard to the regenerate phase, The Method may offer procedures for repeating knowledge identification to evaluate the knowledge balance between the IT sourcing client and vendor at any given moment during the relationship (building block nine) (FR 2.2.4, 3.7.4).

While we have described an overview of The Method's procedures and how The Method interacts with the IT sourcing cycle, we will now continue in the following section to describe each method element in greater detail.

6.2 Overview of the method execution

This chapter will introduce the method elements of The Method. At first the preconditions of The Method will be described. In the following section, a description of The Method's principles will follow. The third part of this section will describe the organizational elements such as roles, phases and required efforts. This organizational section is followed by a section on the structure of the method components. Finally this section will provide guidance on changing and improving The Method before finishing with a summary of this section.

6.2.1 Pre conditions

Before The Method should be applied in any context eight preconditions should be satisfied.

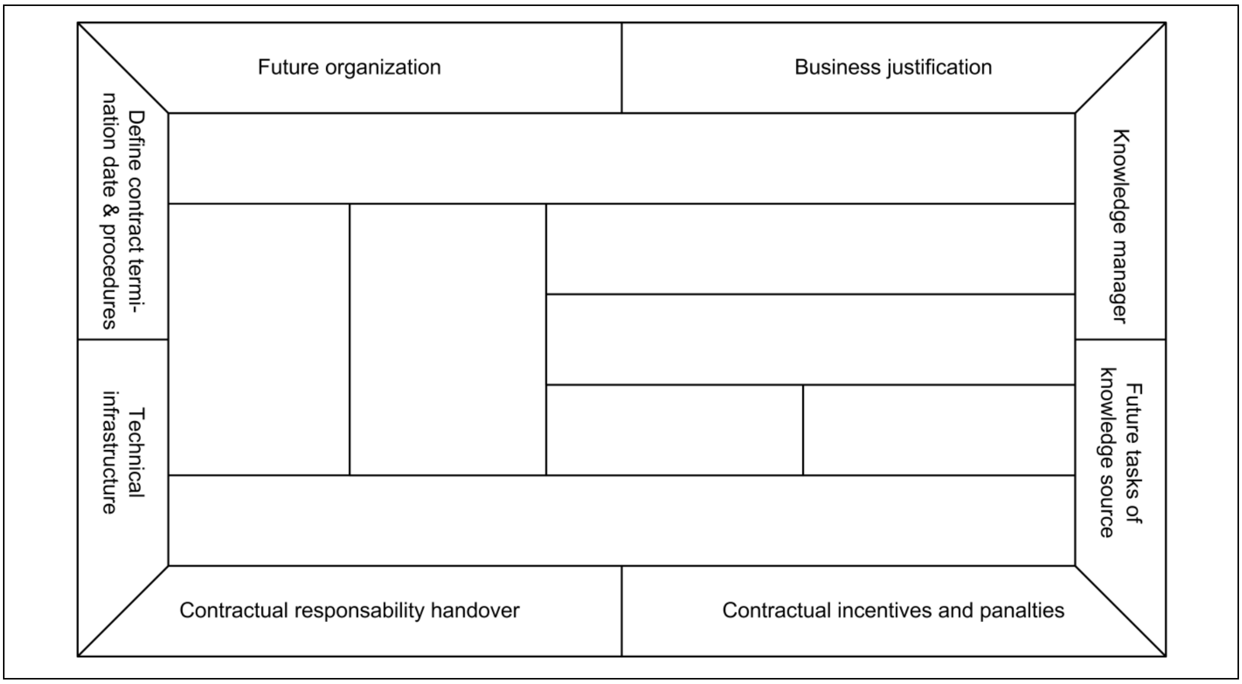

Figure 6-3: Preconditions for The Method

The relevant preconditions are illustrated in Figure 6-3. These preconditions need to be met before any of the other method elements function according to their design, therefore providing a safeguard against uses of The Method which are likely to result in failure.
Each precondition will be described in the following text. To help the assessment, whether these conditions for The Method in particular are met a checklist is provided in ([CHECKPRE] Appendix N). If any of these preconditions are not met it is advised to work towards ensuring them, either with the IT sourcing project sponsor or other involved line managers. Since knowledge transfer is closely related to individual employees, it is strongly recommended to properly communicate the planned knowledge transfer well in advance as part of any IT sourcing project marketing or communication activity (also compare the organizations project management handbook). Some indications regarding useful communication content is offered in [CHECKPRE].

6.2.1.1 Future organization

The future organization has to be agreed upon for the duration of the IT sourcing transition and for the time after the transition completes. This agreement needs to be established prior to beginning with the actual knowledge transfer (i.e., the implementation stage). With regard to the knowledge transfer employees need to be selected to support the knowledge identification and planning and to later shape the knowledge transfer team (such as project manager, negotiation experts, consultants and coaches). The availability of these employees needs to be ensured for the duration of the knowledge transfer (FR 1.6.3.2). It is furthermore important to plan for employee resources to create and more importantly maintain documentation after the knowledge transfer (FR 1.5.4). Documentation in many cases loses its value for any organization if it is not properly maintained. In addition, specific reporting structures need to be established and escalation procedures need to be agreed upon between the knowledge source and knowledge receiver firm. Finally, it is important to place the knowledge source under the direct supervision of the knowledge receiving organization (FR 4.2.2.1) for the duration of the knowledge transfer (FR 1.6.4). All of these organizational aspects are best communicated to the employees as early as possible during the IT sourcing initiative.

6.2.1.2 Business justification

As part of the preparations for an IT sourcing initiative it is important to investigate whether a knowledge transfer is justified (FR 1.6.4.1). In cases where production technologies or markets change, or only temporal IT sourcing operations are planned, the costs of a knowledge transfer may outweigh the benefits. Each method component lists estimated values regarding the required effort, and therefore allows an estimate of the total effort required for a knowledge transfer to be executed. A positive cost-benefit analysis is important for the acceptance of a knowledge transfer by the affected employees. It should be supplied no later than during the knowledge transfer planning method component. The difficulties of convincing employees of the necessities for proper knowledge transfer results from the generally indirect value gained through lower costs after the transition of service to the receiving organization. In a backsourcing scenario, the benefits result from lower service fees to the former supplier. In an outsourcing scenario the cost of the new supplier in terms of lost earnings for failing to deliver certain services on-time or on-quality are reduced. In addition, a supplier may significantly increase his or her own revenue by relying less on client employees, whose work-time will be deducted by the client from effective payments to the supplier.

6.2.1.3 Knowledge manager

In order to administrate important knowledge resulting from the knowledge transfer, it is important to assign a knowledge manager to the knowledge transfer initiative (FR 1.5.1). A knowledge manager will be able to monitor the knowledge balance between both the knowledge receiving firm and the knowledge source firm[74]. He or she will be able to enforce the knowledge receiving firm's knowledge management policy regarding documentation guidelines (FR 1.5.4), archiving procedures and other defined knowledge management activities. Whenever no knowledge management organization exists, a member of the knowledge transfer team needs to specify the required policy elements, at least where to store any documents and the minimum structure of documents.

6.2.1.4 Future tasks of knowledge source

To avoid any sense of insecurity regarding his or her employment situation the knowledge source should be informed as soon as possible regarding which future career options are offered to him or her after the IT sourcing transition is completed (FR 1.6.4.2). Especially the tasks directly after the knowledge transfer should be specified. While it may not be possible to specify these tasks at the outset of the knowledge transfer planning process, once the knowledge transfer manifest is signed all knowledge transfer participants should be informed regarding the future career path of the knowledge source. Depending on the contract design, knowledge sources may be assigned to more abstract or broader roles (e.g., a software developer becomes a software architect; a salary specialist becomes a relationship manager for salary issues). In any case, these aspects should be

[74] Compare Mertins, K. 2005. *Wissensbilanzen: Intellektuelles Kapital erfolgreich nutzen und entwickeln*. Springer, Berlin.

well defined, before any implementation stage activity begins (i.e., during the planning stage, compare section 6.1).

6.2.1.5 Contractual agreements regarding incentives and penalties

In the process of contract negotiations between the knowledge source and the knowledge receiving firm, incentives regarding knowledge transfer success criteria should be agreed upon; apart from the usual operational criteria such as service level agreements (SLAs) and operation level agreements (OLAs). Specific penalties and contractual sanctions should be agreed upon if knowledge transfer target measures are not met and rewards should be negotiated in case the targets are met earlier or with higher quality (FR 1.6.2). In addition, a distribution formula of ether penalties or incentives should be defined (i.e., which penalties or incentives are affecting the firm and which individual employees).

6.2.1.6 Contractual agreements regarding responsibility handover

In addition to contract elements covering incentives and penalties, contract negotiations between the IT sourcing parties should define how responsibilities are transferred. The Method proposes that at each time only one firm is responsible for service operations, but at a small handover interval the individual employees involved are both equally held accountable for the operations, while the knowledge receiver executes all relevant work. During this period, the knowledge source organization needs to ensure that it can take over the operations at any point in time, should the knowledge receiver prove incapable of performing the work related to the knowledge transfer. If the knowledge receiver is suitable to carry out the relevant work, and the knowledge receiving firm takes over full responsibility, agreements need to be made detailing the terms under which the knowledge source firm will provide any further assistance (FR 1.6.3, 1.6.5).

6.2.1.7 Technical infrastructure

Storage (FR 1.5.2.1), search (FR 1.5.2.2) and tracking (FR 1.5.2.4) of artifacts such as documents and source code and other information source requires an information system and a knowledge store to be available (FR 1.5.2.2). The greater the functionality that can be provided by a single system (FR 1.5.2.6), the lower the training effort will be, and the faster the knowledge transfer can be carried out. The technical infrastructure is to be provided by the knowledge management organization of the knowledge receiving organization. The Method describes useful tools to be employed on such a knowledge store information system in each method component. Detailed requirements regarding such a platform are found in (Appendix X). Usage scenarios in addition to some conceptual aspects are offered.

6.2.1.8 Defined contract termination date and procedures

If an IT sourcing is first designed, we recommend designing contract clauses that include knowledge transfers back to the client or third parties (FR 1.6.5). In particular, firms should agree how knowledge, worthy to be transferred, is identified at contract termination and how the extent of the knowledge transfer effort is defined. These clauses should also define which knowledge source should be available and for how long at what rate. In addition, the required documentation standards should be described.

In the case of a backsourcing scenario it is important to define a specific date at which the contract terminates well in advance (FR 1.6.3.1). The required procedures, if not already defined in the contract, may be introduced at an earlier point to avoid confusion or need to be agreed upon in a separate contract.

6.2.2 Design principles

The Method is based on a series of principles which govern all other aspects of The Method. The following Figure 6-4 illustrates the six governing principles.

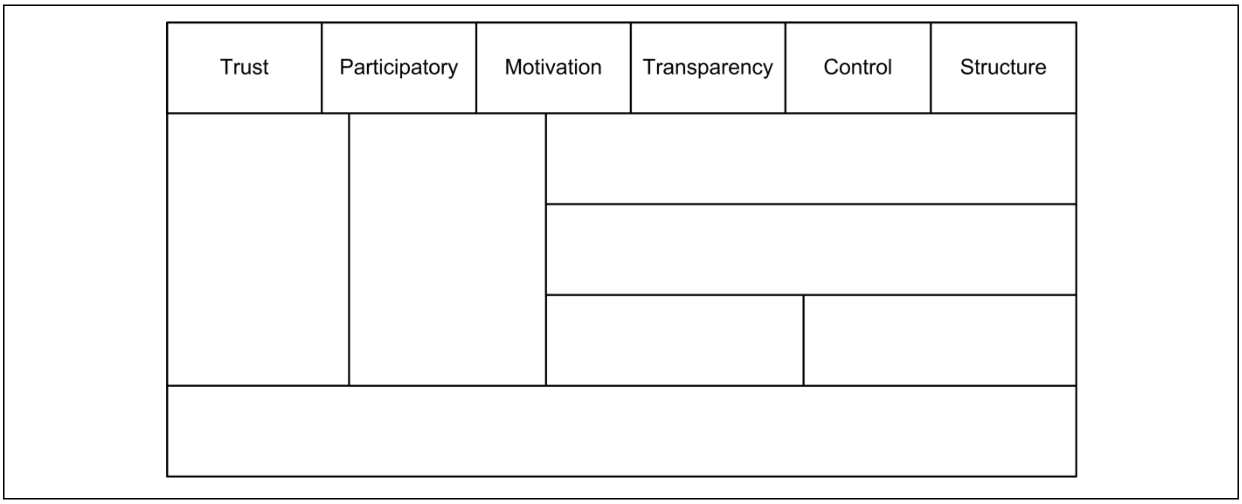

Figure 6-4: Design principles of The Method

In the following section each principle will be introduced and its impact on The Method will be outlined.

6.2.2.1 Knowledge transfer and trust

To build up initial trust the planning process is carried out jointly (FR 2.1). Following the planning process it is essential to build up trust in the skills (FR 2.1.1) of the knowledge receiver over time (FR 2.1.2). This is achieved by allowing the knowledge receiver to produce initial artifacts before commencing individual work tasks on his or her own. Once the predefined work performance goals are met and the knowledge source and the knowledge receiver supervisor agree that the knowledge receiver can be trusted to take over individual tasks, the knowledge receiver will begin to execute these tasks. However, the knowledge source will remain responsible for the actions of the knowledge receiver for a brief period of time. Therefore trust in the abilities of the knowledge receiver is essential.

6.2.2.2 Knowledge transfer control

To provide effective motivators and to effectively carry out a knowledge transfer according to a previously determined plan, controlling whether agreed milestones are met is important (FR 2.2). These continuous controls allow tracking of progress by the knowledge receiver firm (FR 2.2.1) and award incentives and penalties as defined in the previously agreed plan. In addition, the results of controlling tasks increase the transparency of the process, allowing every party to observe the status of a given knowledge transfer. The quality of work (FR 2.2.3) in terms of delivered documents (FR 1.1.1) and later in terms of performed tasks (FR 1.1.2) is measured in review meetings. Contractual clauses will establish the knowledge receiver firm to execute these controlling measures with regard to the knowledge source firm (FR 2.2.2).

6.2.2.3 Knowledge transfer motivation

Designing effective motivators for knowledge transfer entails an agreement on equal incentives for the knowledge receiver and source (FR 2.6.3). Both need to receive an equal volume of rewards or respective punishment, if knowledge transfer targets are achieved or not achieved. To determine fair conditions, the possibility of one participant to behave opportunistically needs to be removed (see participatory work principle) and the achievement of targets needs to be measured (see control principle). A mix of both, financial (FR 2.6.1) and career-related (FR 2.6.2) incentives works best.

6.2.2.4 Knowledge transfer participatory work

Many of the knowledge transfer activities need to be performed by a group of people (FR 2.5). First, knowledge items for which the knowledge source and receiver must work together for the transfer must be prioritized. Secondly, the teamwork required at the implementation stage during which the knowledge source needs to support the knowledge receiver transparently must be identified (FR 2.5.3). Finally, some periods, where individual employees are jointly held accountable for operations related to their knowledge transfer initiative (FR 2.5.1), must be defined. In addition, a third party observer reduces the possibilities of opportunistic behavior by any knowledge transfer participant (FR 2.5.4).

6.2.2.5 Knowledge transfer transparency

It is important to plan and execute the knowledge transfer as transparently as possible (FR 2.4). The more information the knowledge receiver firm and knowledge source firm share regarding the knowledge transfer initiative, the less uncertainty arises. In particular, many important aspects such as motivation and control are specified in transparent documents such as the knowledge transfer manifest, including defined responsibility handovers (FR 2.5.1). In addition, individuals who understand the reasons and accept the need for a knowledge transfer initiative are more likely to participate actively.

6.2.2.6 Knowledge transfer structure

The Method is structured in four ways (FR 2.3). First, procedures define the execution of individual activities. Second, the activities are carried out in a structured role model and produce structured documents. Third, the activities, roles and resulting documents are structured into method components. Finally, the result of this structured process is to maintain the knowledge, therefore achieving sustainable knowledge. This requires some form structured of storage and maintenance of the transferred knowledge. While the maintenance is not described as a part of this method, the method show ways to store the knowledge into an information system for further knowledge development, distribution and utilization.

6.2.3 Procedures and organization of the knowledge transfer

The knowledge transfer is structured into four phases and two stages (FR 3.8). The knowledge transfer phases show the process structure, while the stages group individual method components, and therefore activities, across various phases. In essence, the knowledge transfer phases, and the stages grouping together some phases, represent the procedure model of The Method. Figure 6-5 illustrates the four phases and the two knowledge transfer stages. The following section will describe each of the phases and each of the stages in more detail.

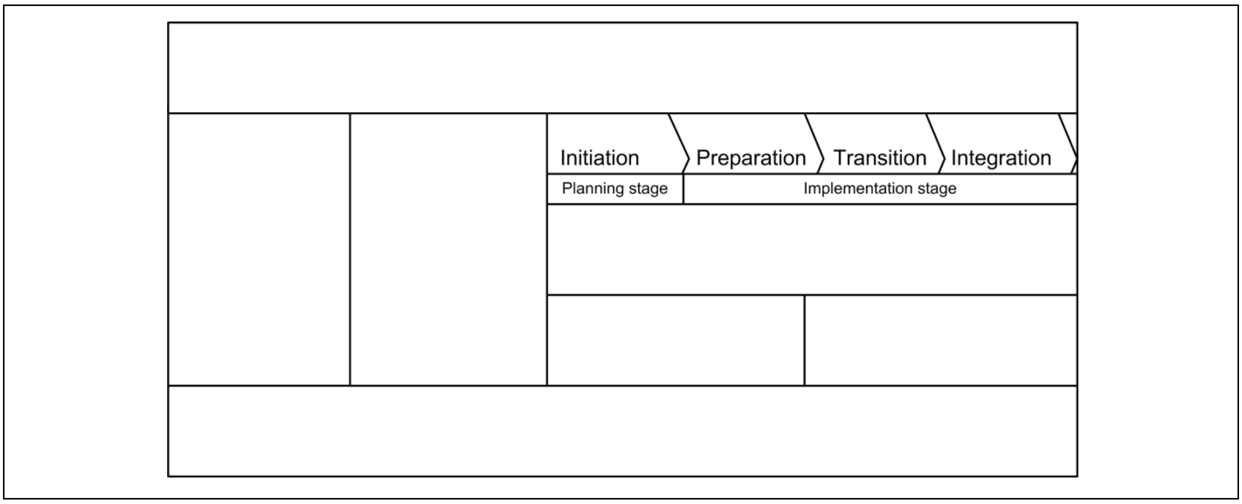

Figure 6-5: Phases and stages of the knowledge transfer process

Following the procedural stage and phase description sections 6.2.3.3 and 6.2.3.2 will describe the required effort and roles for executing the knowledge transfer.

6.2.3.1 Knowledge transfer phases and stages

In order to describe the knowledge transfer phases we will reference the relevant method components and their respective milestones. However, these associations are examples and may change for the method components related to the implementation stage depending on the given knowledge transfer setting.

6.2.3.1.1 Initiation phase

During the initiation phase the knowledge source and knowledge receiver are selected, and the knowledge to be transferred is identified and the specific rules of the knowledge transfer are specified (compare section 6.3). Usually these activities take place during the IT sourcing architect phase. The initiation phase is finished when the "knowledge transfer planed" milestone is completed, more specifically, when the knowledge transfer manifest is signed (compare section 6.4). In general, the knowledge identification is executed prior to the knowledge transfer planning method component.

6.2.3.1.2 Preparation phase

During the preparation phase documentation is prepared according to the knowledge transfer manifest. Information resources and artifacts are exchanged between the knowledge source and receiver, and the transfer of explicit knowledge starts. The knowledge receiver also begins to map the existing documentation and to create any missing and relevant new documentation employing the self study method component (compare section 6.5). The preparation-related activities are usually executed during the transition building block of an IT sourcing initiative.

The preparation phase is generally considered finished once the milestone "knowledge receiver is qualified to apply knowledge" of the self study method component is achieved.

6.2.3.1.3 Transition phase

During the transition phase the acquired knowledge is applied by the knowledge receiver. In this phase the knowledge receiver takes over more and more responsibilities regarding the tasks related to the transferred knowledge (compare section 6.6). Therefore this marks the beginning of the transfer of some implicit knowledge, in other words experience. The transition phase is usually also executed during the IT sourcing transition building block (FR 3.7.4).

6.2.3.1.4 Integration phase

During the integration phase, once the knowledge receiver has proven that he or she is capable of applying the knowledge, the knowledge receiver has to show that he or she is able to train others (compare 6.7 and 6.8). The integration phase is often only executed in the manage building block of an IT sourcing initiative. The integration phase is concluded once the milestone "knowledge receiver maintains responsibility" is reached. Usually, either the method component ad hoc or project reflections are used during this phase. The knowledge transfer finishes once the integration phase is completed.

6.2.3.1.5 Planning stage

The planning stage (FR 6.1) requires that the knowledge identification is executed prior to the knowledge transfer planning method component. This sequence is started during the initiation phase and may extend into the preparation phase if the knowledge transfer planning method component requires extensive documentation efforts. Executing these two method components in exactly this order is required, otherwise the knowledge transfer planning would not have the required documents to be executed (FR 3.8.1). Similarly, the following method components would not be controllable, since no plan would have been agreed upon.

6.2.3.1.6 Implementation stage

The implementation stage (FR 6.2) includes all method components except the ones related to planning. The execution order of these method components is more relaxed. Several of the method components may be executed in parallel or even repeatedly. While we recommend (FR 3.8.2) executing the self study, followed by tandem method components and finally the reflection-related method components, different sequences are possible.

6.2.3.2 Knowledge transfer organization

A knowledge transfer should be treated like any other project, including granting a budget (FR 1.6.4.1), a time restriction (FR 1.6.3) and proper control (FR 2.2) and steering mechanisms. Knowledge transfers do not happen along the way. A knowledge transfer will need planning and progress measurement, otherwise operational priorities will easily push the effort aside.

Whenever a knowledge transfer is organized, it is best planed as neither a technical nor commercial project, but as a type of organizational project, financed by line management budgets (in contrast to dedicated project budgets usually used for commercial or technical projects). This financing option ensures that managers, who are responsible for line budgets, take interest in the project, since failures will easily show in their periodic track record when funds have been invested without archiving the targeted objectives. Managers should plan to finish the knowledge transfer project in parallel with any (technical or commercial) projects requiring the knowledge receiver to apply the transferred knowledge. In any event, the knowledge transfer should not be concluded until the knowledge receiver has been able to apply the received knowledge. Even conceptual knowledge should be applied as soon as possible by the knowledge receiver (FR 2.5.2); i.e., in documentation of the concepts. Such rapid application of knowledge may require managers to initiate dedicated change requests or reengineering projects targeted specifically to allow the knowledge receiver to apply his or her knowledge.

The number of individuals and roles required to execute a knowledge transfer initiative may vary with the size and the project environment. However, at least five roles will always be required of some sort. Figure 6-6 illustrates the roles in the course of a knowledge transfer initiative. The minimum staffing requirements of five individuals is possible, because roles marked as either supervising or managing roles could be held by one person only. That is, the knowledge transfer sponsor and the program manager may be represented by one person, and the supervisor knowledge transfer, project manager knowledge receiver and program office (depending on the method component also the knowledge engineer and moderator) by another. Including the two individuals of the knowledge receiver and knowledge source, and the mandatory supervisor knowledge source five people would be involved excluding activity specialist and the knowledge transfer coach. The following section will each describe one of the illustrated roles. It is important to note that the knowledge source will be placed under the supervision of the knowledge receiver's project manager role. In addition, the role organization aims to place the management of much of the knowledge transfer effort with the knowledge receiver organization. In the case of an outsourcing scenario, this would be the vendor, while a backsourcing scenario would see the client as the knowledge receiver organization.

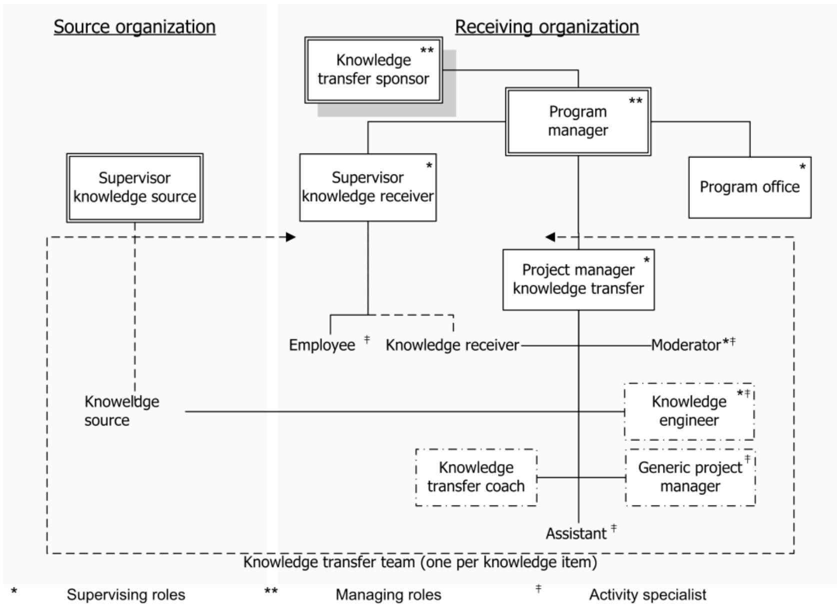

Figure 6-6: Knowledge transfer roles

6.2.3.2.1 Knowledge transfer sponsor

Knowledge management in general and knowledge transfer in specific are basically strategic operations. They improve independence, enhance flexibility and build new competitive advantages[75]. Therefore it should be an executive officer who serves as the knowledge transfer sponsor (FR 4.1.1) and decides whether or not to conduct a knowledge transfer as part of an IT sourcing initiative (FR 4.1.1.1). During the knowledge transfer the knowledge transfer sponsor is required to set long-term priorities of strategic importance and to ensure the operational environment for a successful knowledge transfer; i.e., ensure the preconditions outlined before are satisfied. In general, the knowledge receiving organization will initiate the knowledge transfer, either based on contractual terms or internal policies. This should also be the case if the knowledge source organization demands that the knowledge receiving organization transfers knowledge according to The Method. Finally the knowledge transfer sponsor is responsible for ensuring that the employees in his or her department are sufficiently skilled at a given point in time to fulfill their duties.

6.2.3.2.2 Program manager

In the event that several knowledge transfer initiatives need to be executed in parallel, the coordination of these activities should be managed by the program manager (FR 4.1.2, 4.1.2.1). The role is to directly report to the knowledge transfer sponsor and to supervise the program

[75] Compare Quinn, J.B., F.G. Hillmer. 1994. Strategic Outsourcing. *McKinsey Quarterly* **35**(4) 12.

office, knowledge transfer project manager and the supervisor knowledge receiver. The most important responsibility of the program manager is to ensure that each individual involved in the knowledge transfer executes the plan. This requires that strategically important knowledge items as well as operationally urgent knowledge items are transferred to his or her organization. The Program manager is responsible for assessing penalties or incentives for all involved parties, including the knowledge source organization. In order to assist him or her with the decision making, the program office reports to the program manager regarding the knowledge transfer status.

6.2.3.2.3 Program office

The program office (FR 4.2.1) does not supervise any roles in the knowledge transfer initiative, but collects status information and reports these to the program manager (FR 4.2.1.1). The program office acts as an independent entity to control the initiatives progress. Its main task is to check whether milestones are reached and whether document or work quality satisfies the performance and quality measures defined beforehand; i.e., in the knowledge transfer manifest.

6.2.3.2.4 Supervisor knowledge receiver

The supervisor knowledge receiver (FR 4.2.2) needs to ensure that the designated employee to become the knowledge receiver is freed from any conflicting duties and available to the knowledge transfer (FR 4.2.2.1). This role ensures that the knowledge receiver gets to work on projects related to his or her knowledge transfer, either by reserving dedicated time slots or, if day-to-day activities may lead to a crowding-out effect of knowledge transfer, completely making the employee available. In addition, the supervisor knowledge receiver selects suitable knowledge receiver candidates and negotiates individual incentives and penalties with employees. With regard to the knowledge identification and prioritization the supervisor knowledge receiver also defines the urgency of knowledge items, based on expected projects and expected employee fluctuations. Furthermore, he or she must discuss and escalate conflicts between the knowledge source and knowledge receiver with the supervisor knowledge source; i.e., when they are brought to his or her attention, either directly or by the project manager knowledge transfer. It is recommended that a project manager knowledge transfer is simultaneously acting as a supervisor knowledge receiver.

6.2.3.2.5 Project manager knowledge transfer

For the duration of the knowledge transfer initiative the knowledge source and the knowledge receiver directly report to the project manager knowledge transfer (FR 4.2.3, 4.2.3.1). Their supervisors may request dotted line reports. The project manager knowledge transfer is provided by the knowledge receiving organization and responsible for the knowledge transfer, and reports to the program manager. These responsibilities consist of managing the knowledge identification and the knowledge transfer planning, as well as the execution of each method component according to the knowledge transfer manifest signed at the end of the knowledge transfer planning. Therefore, the project manager knowledge transfer needs to check whether agreed upon milestones are reached. If milestones are failed he or she has to report to either the program manager directly or the program office. In addition to a project budget, the project manager knowledge transfer may supervise the resource of a knowledge transfer coach, a knowledge engineer and depending on the setup other project managers; i.e., project manager of technical projects.

6.2.3.2.6 Knowledge engineer

The knowledge engineer (FR 4.2.4) is an activity specialist required during the first part of the initiation phase of the knowledge transfer. He or she is responsible for the structure of the knowledge item catalog and to organize and filter the collected data (FR 4.2.4). Furthermore, he or she is responsible for cleaning the knowledge item catalog and to relate knowledge items to other parties wherever possible, and therefore modeling the knowledge item catalog. Since the knowledge item catalog should raise the participant's acceptance of the knowledge transfer initiative, a transparent and participatory editing in joint meetings with the knowledge transfer participants is recommended. The knowledge transfer role can be assumed by the same person holding the project manager knowledge transfer role.

6.2.3.2.7 Moderator

The moderator (FR 4.2.5) is an activity specialist role required for the reflection method components (FR 4.2.5.1). He or she is responsible for maintaining an objective atmosphere and to help all participants to remember a given situation as objectively as possible. He or she should focus on solution oriented questioning techniques to help the group in identifying reusable action patterns. The moderator may rotate and is elected by the group itself.

6.2.3.2.8 Knowledge transfer coach

The knowledge transfer coach (FR 4.3.1) assists the project team with all questions relating to The Method and is available in all knowledge transfer phases (FR 4.3.1.1). On one hand he or she will support the knowledge engineer during the modeling of the knowledge item catalog and the project manager knowledge transfer in designing principle-true knowledge transfer manifests.

On the other hand he or she supports the knowledge source and knowledge receiver in the proper application of knowledge management policies, documentation policies or software tool usage as well as other internal procedures (such as reviewing). The knowledge transfer coach may assist other roles

6.2.3.2.9 Knowledge receiver

The knowledge receiver's (FR 4.3.2) involvement starts with the knowledge transfer planning. He or she should help to define realistic targets. At the end of the initiation phase of the knowledge transfer process he or she needs to commit to the knowledge transfer manifest and sign it. Furthermore, he or she is to carry out specific tasks during the preparation and transition phase. These tasks are specified in the knowledge transfer manifest. Beginning with the integration phase the knowledge receiver becomes the actual knowledge source. Therefore, at the start of the integration phase he or she will hold all responsibility regarding the activities and tasks associated with the knowledge transfer. He or she should be able to execute these tasks without further assistance of the former knowledge source. In addition, the knowledge receiver will now be responsible for maintaining any artifacts and documents related to the knowledge transfer according to the knowledge management policy of the firm. Finally, the new expert is expected to train a deputy knowledge receiver during the integration phase. In case any problems emerge, these should be reported to the project manager knowledge transfer.

6.2.3.2.10 Knowledge source

During knowledge transfer planning, the knowledge source (FR 4.3.3) may assist the supervisor knowledge receiver to identify suitable knowledge receivers as well as to define suitable targets and measures. Similar to the knowledge receiver, he or she will have to confirm his or her individual commitment to the knowledge transfer by signing the knowledge transfer manifest at the end of the knowledge transfer planning. During the preparation and transition phases the knowledge source supports the knowledge receiver (indirectly) by answering questions, explaining relationships, providing documentation templates and offering reviews of documents (or other artifacts) produced by the knowledge receiver. During the transition phase, after a certain work performance has been determined with the knowledge receiver, the knowledge source will no longer perform tasks related to the knowledge transfer him/herself. Instead he or she will remain responsible, but the knowledge receiver will carry out the tasks. To allow the knowledge receiver to apply his or her knowledge, it is important during this phase to accept any errors the knowledge source could have avoided, and not hand back the tasks to the knowledge source too quickly[76]. If the knowledge receiver is not allowed to learn from his or her own errors and gain experience an important knowledge transfer mechanism will fail, e.g., transfer of implicit knowledge.

Once the integration phase start, the knowledge source will start working in his or her new role. Should any problems emerge during the knowledge transfer, the knowledge source should report to the project manager knowledge transfer.

6.2.3.2.11 Supervisor knowledge source

It is the duty of the supervisor knowledge source (FR 4.3.4) to inform the knowledge source as soon as possible regarding his or her future career options (FR 4.3.4.1). In the case of an IT outsourcing four options may present itself. First, the knowledge source gets hired by the receiving organization. Second, the knowledge source is temporarily hired by the receiving firm (and possibly returns to the source firm in the event of a backsourcing). Third, the knowledge source remains with the source firm. Finally the knowledge source may be employed outside of the source organization. In the case of such an outplacement, it is important to ensure that the employee remains with the knowledge source for at least the time the knowledge transfer is carried out – and possibly longer for eventual post knowledge transfer consultations. In the event of the receiving firm taking over the knowledge source employees of both parties need to agree which role the employee will take after the knowledge transfer in the receiving firm. In some cases the individual will only be required at the receiving form for a limited period; i.e., until internal knowledge transfers are finished. If a knowledge source remains with the source organization after the knowledge transfer, the supervisor knowledge source needs to clearly define which future roles the knowledge source will hold and when he or she is expected to start these.

Depending on the aforementioned career development options, the supervisor knowledge source will have to define incentives and penalties accordingly. Furthermore, the supervisor knowledge source needs to ensure the availability of the knowledge source for the duration of the knowledge transfer. Finally the supervisor knowledge source will have to agree that the direct reporting of the knowledge source will be to the project manager knowledge transfer. If the knowledge source reports complaints, these are to be directed from the supervisor knowledge source to the supervisor knowledge receiver according to a defined reporting procedure.

[76] If the knowledge source continues to execute the relevant tasks without meeting the work performance targets, the task should not be given back to the knowledge source. In such a case either the knowledge receiver should be given more time to execute the task in a simulated environment, or if the failures are grave, the initiative may be stopped.

6.2.3.2.12 Generic project manager

In some method components we will reference a generic project manager. These project managers will become important, when the knowledge receiver needs to start applying his or her knowledge to real projects. Without such hands-on experience the knowledge receiver cannot be measured against work performance goals. Therefore these project managers need to accommodate the knowledge receiver as a project resource. The project manager knowledge transfer will engage several generic project managers and work with them to select suitable projects to integrate the knowledge receiver. Normally the generic project manager would suggest suitable projects to the project manager knowledge transfer.

6.2.3.2.13 Employees

In addition to the aforementioned roles, all other employees (FR 4.3.5) at the knowledge receiving firm may become involved at least as far as the colleagues of the knowledge receiver. First, many colleagues will assist in the knowledge identification effort in the initiation phase (FR 4.3.5.1). Secondly, during the integration phase a fellow colleague will become the deputy knowledge receiver (FR 4.3.5.1).

6.2.3.2.14 Assistant

The assistant and technical writer role (FR 4.3.6) is most prominently required in the reflection method components. There the role will assist the moderator in recording the meeting protocol and in authoring the final report (FR 4.3.6.1). This role may also edit other documents produced in the course of the knowledge transfer. Because, depending on the domain at hand, few people are proficient in writing documents that are helpful to others.

6.2.3.3 Knowledge transfer effort

The individual method components each are relevant to different knowledge transfer phases and each method component requires different workloads by different knowledge transfer participants. Depending on the knowledge transfer phase and relevant method components the overall effort intensity to be expected by an organization is shown in Figure 6-7. The chart shows cumulated team effort in approximated weekly work-load percent per phase and method component in addition to a directional indication (e.g., increasing, decreasing, stable) – therefore the black area roughly indicates the total effort of the team. For example, during the first phase there is no effort related to the reflection and tandem method component. In the beginning of that phase a small but growing proportion of the team's time is expected to be spent on the knowledge identification method component. After reaching a maximum of utilizing about 60%

of the knowledge transfer teams' time, the knowledge identification effort will decrease. Then the knowledge transfer planning will begin to require increasing amounts of time of the knowledge transfer team until reaching about 60% and remaining constant well into the preparation phase. Towards the end of the initiation phase the knowledge transfer team will begin to slowly invest more and more time into the self-study method component. The individual efforts per role and the knowledge transfer phase can be estimated based on effort estimation guidelines provided with each method component.

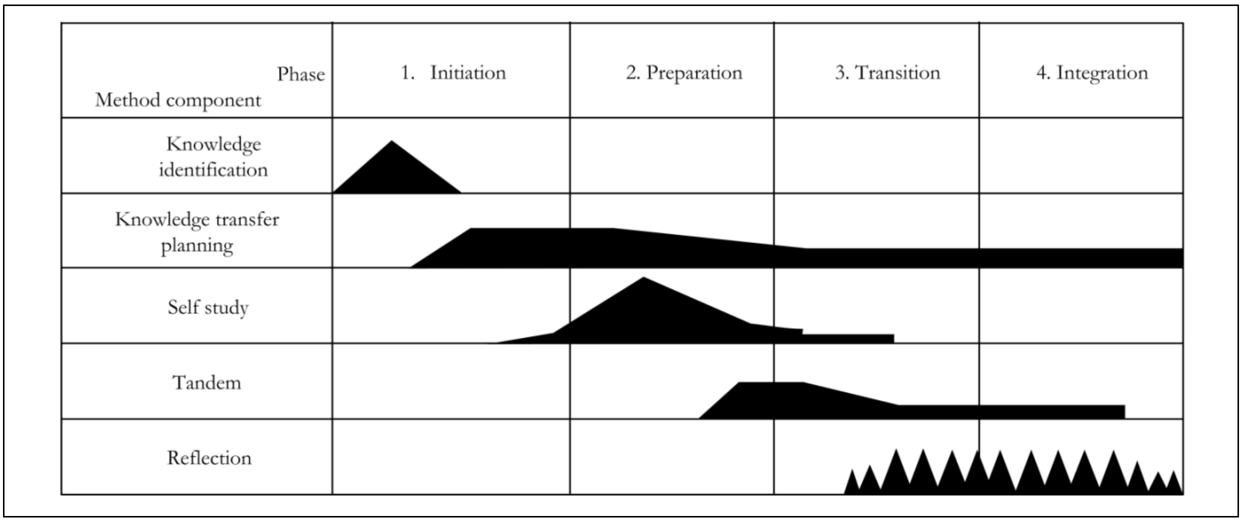

Figure 6-7: Schematic directional effort profile per phase in The Method

During the initiation phase most of the effort will have to be provided by the knowledge transfer project manager and the knowledge transfer activity specialist for knowledge identification (also referred to as knowledge engineer). First during the knowledge identification, in collaboration with other employees of the receiving firm, then during the planning, this will also require the knowledge source and receiver to become involved. In the end of the initiation phase the knowledge transfer sponsor and the supervisor knowledge receiver will also have to expect modest workloads.

During the preparation phase the knowledge receiver is expect to provide the main effort. The knowledge source will also have to expect a high workload, at least during the beginning of the preparation phase. The project manager, and later the knowledge source, will have to expect a medium workload. Finally, the program manager and the program office can expect modest to small involvement.

Except for the knowledge source, whose load will temporarily rise and quickly lower after the responsibility handover, all other knowledge transfer participants are expected to be involved with comparable workloads during the transition phase as at the end of the preparation phase.

As soon as the integration phase starts, the overall workload with regard to the knowledge transfer will be lower for the knowledge receiver at the beginning. However, all knowledge transfer participants will experience a slight surge in activity with regard to the knowledge transfer initiative towards the end, when administrative duties to finalize the knowledge transfer are required.

6.2.4 Method components

The Method organizes many of the formal elements of a method into method components. Each method component consists of a set or involved roles, activities and creates resulting document according The Method principles. In many cases the document creation is assisted by several tools. Each method components has a similar structure and is associated either with the planning stage or the implementation stage. The following section will briefly describe the method components of The Method. The proceeding section will outline the structure of a method component.

6.2.4.1 Method component overview

The presented edition of The Method consists of six method components: knowledge identification, knowledge transfer planning, self study, tandem, ad hoc reflection and project reflection. As presented earlier, each of these components are associated with a given stage and therefore a given knowledge transfer phase. The planning stage includes the method components knowledge identification and knowledge transfer planning. The implementation stage includes the method components self study, tandem, ad hoc reflection and project reflection. These associations are pictured in Figure 6-8.

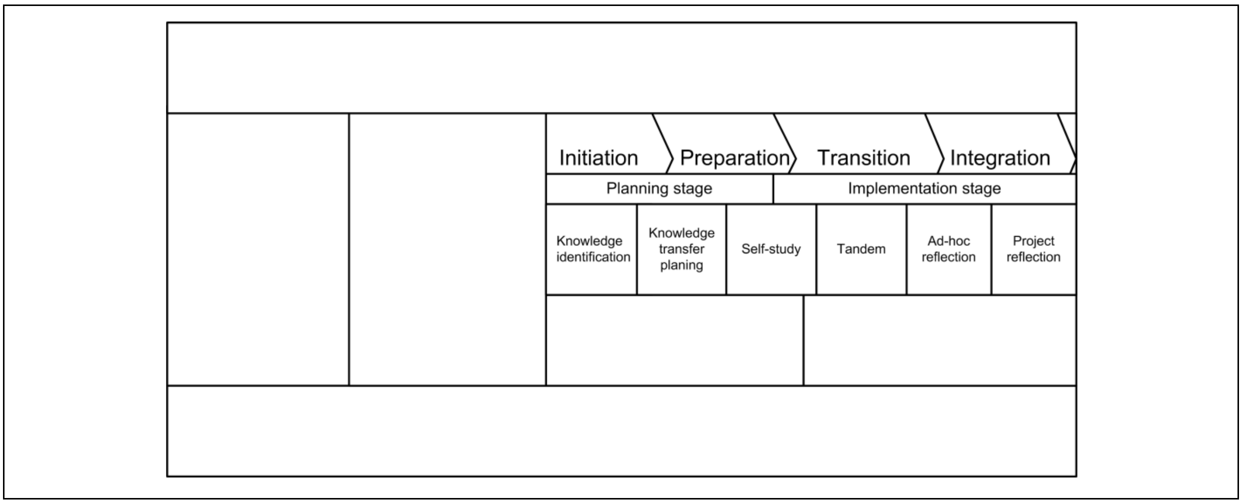

Figure 6-8: Method component association to knowledge transfer stages and phases

6.2.4.2 Method component structure

Every method component describes several administrative attributes, such as estimated effort. To improve the usability of a method component, each method component references tools and templates for individual tasks. The structure of the remainder of the method component is related to software pattern descriptions.

A short introduction explains the content of the method component. The effort profile in each method component contains approximate guidance[77] to estimate the required resources to execute the method component. The estimation guide is based on the volume of the knowledge transfer initiative as well as availability of resources.

The method component's section on naming describes the origins of the method component and leads towards the purpose and motivation of creating the method component in the first place. This section describes the fundamentals of the method component and describes how the method component should be used. Details regarding the fitness for a given purpose are described in the usage and non-usage sections.

Most importantly the course of action section describes the execution process of the method component step by step. The section starts with an overview of the activities, followed by an introduction of each role and its specific responsibilities. However, only roles which execute a specific activity are referenced, and therefore the general support role of the program office is not mentioned. Following the role description the coordination of activities among roles is described. Finally, the activities are listed in their order of execution. The section closes with references to important tools.

The last three sections of each method component consist of a description of the advantages and disadvantages of every method component, examples of its use and related research.

6.2.5 Extending The Method

It is to be expected, that The Method, once deployed to an organization will be modified and extended over time. For example, we expect the effort estimation rules to become more precise or additional method components to be added to The Method. Less likely but still expected is a change in the method component structure, or an adaptation to a more general knowledge transfer case for knowledge transfer within firms as well as between firms. The following paragraphs will highlight aspects of The Method that need to remain intact for The Method to stay consistent with its design objectives.

[77] The presented guidance is consensus driven and not empirically validated.

The core elements of The Method are the principles and the procedure model. Any changes of these elements will compromise the consistency of The Method considerably. If changes regarding these aspects are found to be required, it would be best to design a different method, rather than to adapt The Method. However, this is far from asking that the description of these method elements may not change over time.

In the case that changes regarding the method component structure are required, it is important to adapt all method components accordingly. In addition, it needs to be ensured, that any adaptation can be meaningfully implemented in all method components. As the collection of method components is extended, a mechanism for deciding in favor or against certain method components in any given knowledge transfer situation should be added to the knowledge transfer planning.

Additional method components based on the current method components structure are less problematic and should be easily integrated. Changes to the procedure and organization section of this section should be applied where appropriate. In addition, all method components related to any new method components need to be revisited and checked for redundancies and overlaps. New method components extending The Method in such a way will reuse the presented role model, project organization and procedure model as well as respecting the methods principles entirely.

In summary we expect three groups of method documentations to change with different frequencies. The most frequent changes are expected to communication material of The Method (e.g., fliers and slides) or changes to templates produced to facilitate the method execution. The second most frequent changes are probably expected to The Method as outlined by adding or modifying method components. Finally the most infrequent changes would happen to the structure of method components, the role or procedure model or any extension of the methods principles.

6.2.6 Summary

The Method describes a structured procedure to execute knowledge transfer in an IT sourcing environment. The goal of the method is effective knowledge transfer. The method starts with the planning of the IT sourcing initiative and continuous through the sourcing life cycle. Being a sub project to the IT sourcing initiative, the knowledge transfer has to be managed as an independent project. For successful knowledge transfer it is best if many, ideally all, of the eight preconditions are satisfied. Should individual preconditions not be met, it becomes more important to satisfy the remaining ones rigorously or work towards satisfying all preconditions prior to starting the knowledge transfer.

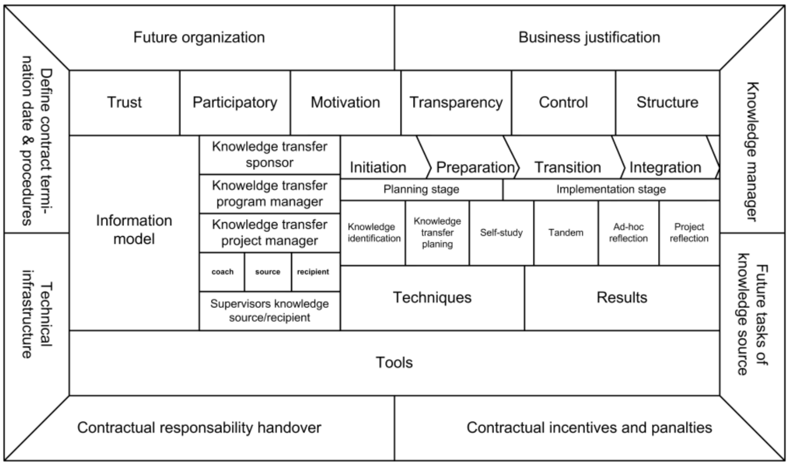

Figure 6-9: Conceptualized overview of The Method

The Method is composed of eight constituent method elements. Four of these, principles, role model, procedure model and activities have been outlined so far. The remaining four will be described in more detail only in the method components sections. These six method components in turn implement the already presented method elements. The method principles govern many design aspects while the roles define how work is distributed among knowledge transfer participants. The procedure model outlines the sequence of the individual method components. The sequence is referential in nature for the implementation stage and mandatory for the planning stage. Therefore the suggested order of execution is: Knowledge identification, knowledge transfer planning, self study, tandem and either of the two reflection method components.

6.3 The knowledge identification method component

6.3.1 Introduction

Knowledge identification marks the beginning of the knowledge transfer. This method component strongly builds upon the concept of cooperative consensus building. The aim of this method component is to produce the knowledge items catalog by collecting the relevant knowledge items according to strategic and operational priorities.

6.3.1.1 Method component effort profile[78]

Role	Effort
Knowledge transfer sponsor	Est. 4-6h for each organizational unit Estimation criteria: Number of knowledge areas * 0.1h
Program manager	Est. 4-6h for each knowledge area Estimation criteria: Number of knowledge areas * 0.1h
Supervisor knowledge receiver	Est. 6-8h for each knowledge area Estimation criteria: Number of involved teams * 4h
Project manager knowledge transfer	Est. 20-26h each team in organizational unit Estimation criteria: Number of involved employees * 1h
Knowledge engineer	Est. 20-30h for each team in organizational unit Estimation criteria: Number of involved employees * tasks * 0.5h
Knowledge transfer coach	Est. 5-10h for each team in organizational unit Estimation criteria: Number of involved employees *.05h
Employees	Est. 4-6h for each knowledge area Estimation criteria: Number of tasks * 0.2h

6.3.2 Naming

The goal of knowledge identification is first to identify the required knowledge (target) and the existing knowledge (actual). This information is then used to prioritize and, based on the target/actual analysis, define a demand. This demand is to be satisfied through the implementation stage method components. The identified knowledge represents the knowledge transfer baseline for prioritization and guides the knowledge transfer in terms of content.

6.3.3 Purpose and motivation

Knowledge identification is based on a cooperative (FR 2.5) and transparent (FR 2.4) data collection and structuring process (FR 2.3). First, knowledge is identified to establish a demand (FR 1.2). Then the demand is evaluated through prioritization. The unit of analysis is the knowledge item. A knowledge item is defined through the aggregation of people (FR 5.2.2), roles (FR 5.2.2), tasks and information resources (FR 5.2.1). The affected people and roles are

[78] The effort profile provides estimated typical workloads per role with regard to dyadic knowledge transfers. Actual figures may vary based on the estimation criteria and other factors.

responsible for executing the knowledge-intensive tasks. In order to manage multiple knowledge items, additional attributes for prioritization, such as urgency and importance are specified (also compare to 6.3.6.2).

The approach is influenced by operative (urgency) and strategic (importance) factors as well as timing and content-related aspects. The identification process is able to reveal the actual demand early on and serves as planning baseline for the knowledge transfer planning method component. Finally, knowledge identification is aimed at determining the knowledge that needs to be transferred from the knowledge source organization and cannot be acquired from another means; i.e., through training and schooling.

6.3.4 Usage

Firms without an established knowledge management organization or with a poorly developed knowledge management organization may lack existing knowledge bases or concepts with which to identify either the skills or knowledge of the employees. In these cases, knowledge is often too abstract and ill-defined. Therefore, knowledge as it stands cannot be used to measure the progress of any knowledge transfer initiative. Therefore, The Method introduces and defines the knowledge item as a defined unit to track, control and manage throughout the knowledge transfer (FR 2.2).

If existing data sources are available (such as skill catalogues, business processes, competency databases, ontology or employee databases), some attributes from them may directly seed the knowledge items catalog. While some attributes may be directly reused, other attributes can help to extend the knowledge item catalog or validate its content. In any case, the final knowledge items catalog will have to be maintained by the individual fulfilling the firm's knowledge management role (FR 1.5.1).

6.3.5 Non-usage

Whenever the knowledge items catalog cannot be maintained by a knowledge manager role in the future (such as is often the case in smaller firms), the formal knowledge identification method is hardly justified. In order to utilize the collected data, it is mandatory to maintain up-to-date versions of the knowledge items catalog. Otherwise, the information is of little use since some items may change during the course of an IT sourcing relationship. Therefore, an employee in human resources (FR 1.5.3), knowledge management (FR 3.6) or IT sourcing (FR 3.7) would have to take the responsibility of maintaining the knowledge item catalog.

6.3.6 Course of action

The following sections first describe the activities involved in the execution of knowledge identification methods and then the participating roles are described. After describing the roles, cooperation in the required activities will be explained using on an example.

6.3.6.1 Overview of activities

In summary, the knowledge identification can be described in terms of a process synopsis. Figure 6-10 shows the synopsis for the knowledge identification method component.

Name	Knowledge identification
Precondition	A knowledge transfer was initiated and the pre conditions for The Method are satisfied.
Result	A list of knowledge items, ready for transfer
Participating roles	Knowledge transfer sponsor Program manager Supervisor knowledge receiver Project manager knowledge transfer Knowledge engineer Employees
Milestones	Knowledge items catalog prepared Knowledge items prioritized
Tools	Knowledge map or Excel template of knowledge items catalog
Frequency	Approximately once every twelve months

Figure 6-10: Process synopsis of knowledge identification

At the beginning of the process, all employees are asked to define possible knowledge items or verify any seeded knowledge items from an existing data source. Employees would be asked not only to describe tasks, but also to find knowledge related to these tasks. Following the data collection, redundant knowledge items will be removed and knowledge items will be categorized into knowledge areas.

In parallel, a managing role (e.g., the knowledge transfer sponsor) defines strategic knowledge areas and prioritizes these. At the same time, the supervisors of the knowledge receivers prioritize knowledge items based on their operational urgency. Once these two tasks are completed, managing and supervising roles will meet and decide on a final evaluation. The evaluation will address all knowledge items that received differing urgency appraisals and importance evaluations.

The evaluation meeting will result in a list of knowledge items which need to be transferred for each supervisor of knowledge receivers. The list represents a well-timed demand of knowledge. The supervisors will then create a suitable plan for transferring these knowledge items.

6.3.6.2 Knowledge items catalog modeling

A knowledge item (FR 5.2.3) is modeled as an object with four attributes: role, task, urgency and importance. In addition, each knowledge item is related to at least one instance of the following objects: InformationRessource, HR_Unit, KnowledgeArea and KnowledgeTransfer. All of these components are illustrated in Figure 6-11.

The information resource (FR 5.2.1) and the human resource unit (FR 5.2.2) are both representing a type of media within a knowledge store. The information resource media stores explicit knowledge in terms of documents and other artifacts; the human resource unit media stores implicit knowledge in terms of knowledge recipients and sources, and the collective experiences of the knowledge recipients. The knowledge area (FR 5.2.4) in turn represents a collection of knowledge items that are related to one another. A knowledge area determines the importance of a knowledge item. The human resource unit object assigns an individual and his or her associated responsibilities to a knowledge transfer object. In addition, the knowledge recipient and knowledge sources are associated with the HR unit and therefore assigned to a knowledge transfer object (FR 5.2.5).

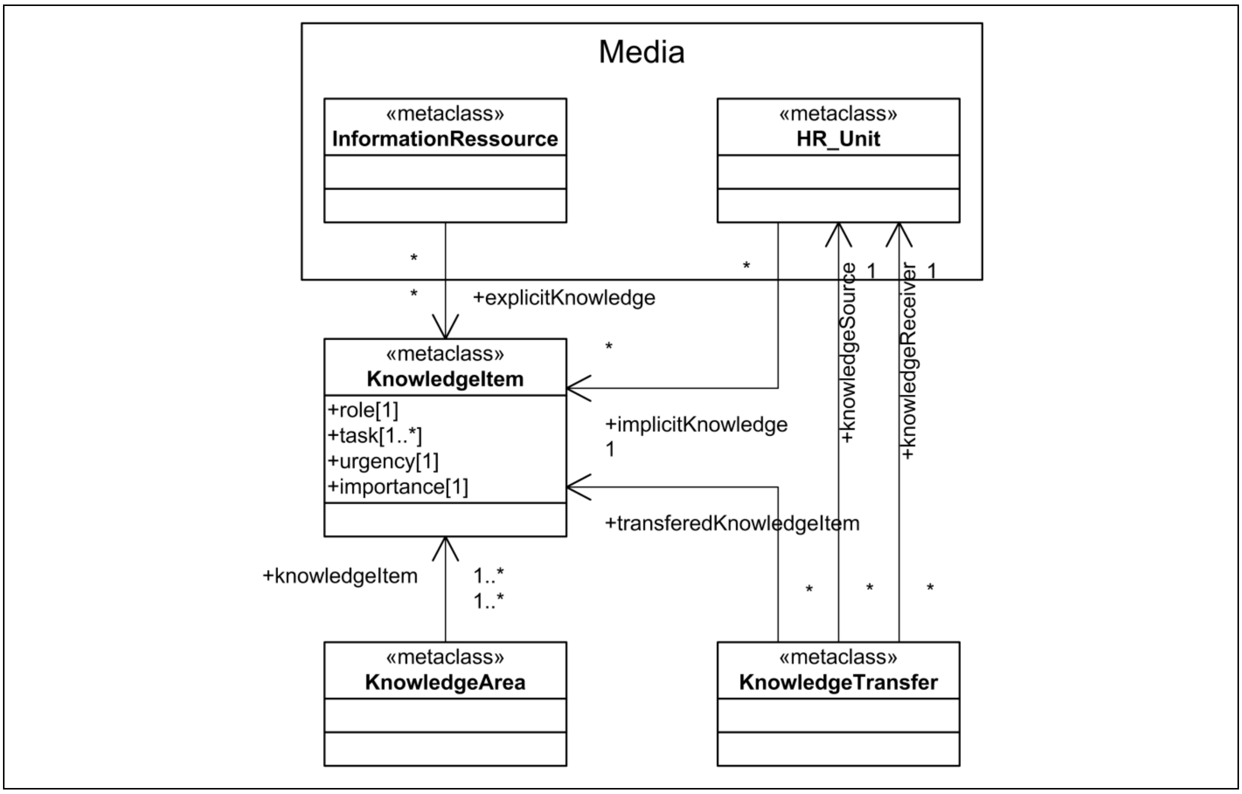

Figure 6-11: Meta object model of a knowledge item

Figure 6-11 illustrates the interactions between the presented objects. To facilitate the display of the model, it is translated into a relational model (Figure 6-12 below) for practical usage in the knowledge item catalog file (see the activities section below). Therefore the table lists the following attributes: Knowledge area, knowledge item identifier, synonym, short description, importance, urgency, URL of knowledge item specification, role and related tasks. With the exception of synonyms and short descriptions, all attributes directly relate to the meta-model. The knowledge area object is represented through an identifier; the attributes of the knowledge item object are represented directly. The information resource object is represented through the URL of knowledge item specification. Synonyms and short descriptions help with differentiating similar knowledge items and improve the ability of individuals to interpret knowledge items.

Optionally, the knowledge identification may already collect the following data (which will become mandatory for the implementation of knowledge transfer planning): source, knowledge source, knowledge receiver, ease of codification, required degree of distribution, required life-time, expected transfer complexity. Figure 6-12 provides an overview of each of the referenced fields and their permitted values.

Mandatory field	Values	Optional fields	Values
Knowledge area	Text – a few words	Source	Name or unit
Identifier	Text – a few words	Knowledge source	Name
Synonym	List	Knowledge receiver	Name
Short description	Text – a few sentences	Ease of codification	High, medium, low
Importance	High, medium, low	Degree of distribution	High, medium, low
Urgency	High, medium, low	Life-time	Number of months
URL of specification	URL	Transfer complexity	High, medium, low
Role	Text – a few words		
Tasks	List		

Figure 6-12: Mandatory and optional fields of a knowledge item as part of a relational knowledge item catalog

6.3.6.3 Participant roles

Knowledge transfer sponsor: As a strategic representative, the knowledge transfer sponsor (FR 4.1.1) will have to define the strategic importance of individual knowledge items by assessing the strategic impact of certain knowledge areas. The knowledge items will inherit the strategic importance from their associated knowledge areas. In addition, the knowledge transfer sponsor needs to communicate (FR 1.6.4) the knowledge transfer goals clearly (FR 2.4) and to set corresponding objectives (FR 1), conveying this to individuals such as the program manager.

Program manager: In the case of larger IT sourcing initiatives with multiple knowledge transfers in different units, a program manager (FR 4.1.2) is required to manage the various knowledge item catalogues per unit and to manage their consolidation (FR 4.1.2.1). A group of knowledge engineers may be able to assist in the consolidation process.

Supervisor knowledge receiver: He or she is responsible for prioritizing knowledge items according to operational urgencies, such as expected employee fluctuations, upcoming projects or expected system changes. In addition, he or she should be aware of any informal knowledge transfers already being conducted and should take their progress into account (FR 4.2.2 and 4.2.2.1).

Project manager knowledge transfer: The project manager knowledge transfer assumes the usual project responsibilities, including the responsibility for the knowledge transfer success (FR 4.2.3) and managing all participants (FR 4.2.3.1). These include ensuring that the collection and prioritization of knowledge items both by managing roles as well as by supervising roles is properly done. The project manager of knowledge transfer also maintains the oversight of the knowledge items catalog.

Knowledge engineer: The knowledge engineer (FR 4.2.4) will oversee the creation of an initial list of knowledge item contenders. He or she will assist in extending and consolidating the list (FR 4.2.4.1). In the case of an IT outsourcing knowledge transfer scenario, in exceptional cases, the knowledge source organization may want to provide the knowledge engineer with the resources to maintain a greater level of control over the transferred knowledge.

Knowledge transfer coach: The knowledge transfer coach (FR 4.3.1) supports the knowledge engineer in creating the initial seeding of the knowledge item catalog. He or she provides advice based on previous knowledge transfer initiatives, the firms knowledge management policy and literature (FR 4.3.1.1). Furthermore, the knowledge transfer coach shows the efficiency potentials of the knowledge identification process.

Employees: Since no knowledge source or knowledge receiver has yet been specified, the employees of any prospective knowledge receiver supervisor (FR 4.3.5) are asked to specify knowledge items during the knowledge identification process (FR 4.3.5.1). Depending on the operational setup, dedicated employees may prepare a seed list and discuss the list with the team. Another setup may require employees simply to suggest knowledge items for their supervisor's consolidation.

6.3.6.4 Cooperation between roles

The program manager will require each organizational unit to produce an independent knowledge item catalog. The restructuring, consolidation and evaluation are to be carried out by the knowledge engineer in cooperation with the respective unit supervisors (e.g., team leader, department heads, etc.). Special care must be taken when consolidating knowledge items. Certain knowledge items that cannot easily be associated with an existing knowledge area may be operationally important. The knowledge engineer might need to create new knowledge areas for these knowledge items.

Descriptions of business processes being sourced (e.g., core business function, business areas, role and job description etc.) (FR 6.1.1.2 and 6.1.1.2) often represent suitable seed sources for knowledge areas. However, sufficiently detailed and complete descriptions of these business processes need to be available. During the knowledge identification process, the knowledge item catalog is best maintained as a list (FR 1.5.2.5). At a later, more stable point in the knowledge transfer initiative, a graphical representation may be helpful to access the knowledge catalog more easily. A Graphical representation may help users to identify related knowledge items of interest faster and improve the understanding of a knowledge item context.

Once all the knowledge items are collected, the evaluation and prioritization can commence. The most difficult aspect is arriving at a consensus regarding knowledge items which receive different assessments by managing and supervising roles. The project manager knowledge transfer is responsible for negotiating agreements between conflicting parties.

6.3.6.5 Activities

1. Kick-off*:* The knowledge transfer sponsor begins by asking the program manager to create a knowledge item catalog. Consequently, the program manager asks one or more project managers knowledge transfer to build (partial) knowledge item collections. In parallel, the supervisors of potential knowledge sources are informed (FR 2.4). The supervisor knowledge receiver role is also informed; though no independent action is required, he or she may be approached by the project manager knowledge transfer for assistance. The kick-off should be accompanied by valid reasoning in favor of a knowledge transfer, such as a cost/benefit analysis (FR 1.6.4.1).

2. Creating term lists: The knowledge engineer, supervisor knowledge receiver and project manager knowledge transfer will generate (possibly supported by other employees) a list of all relevant responsibilities for tasks which are assigned to individual people (FR 6.1.1.1) – relevant with regard to the service or product being sourced. Each of the responsibility areas will be identified by a textual identifier (FR 6.1.1.5). This identifier will become the knowledge item name. In addition, the identifiers will be accompanied by a short two to five sentence description of the knowledge item (FR 6.1.1.6). Finally, the knowledge item will be related to any suitable knowledge area (FR 6.1.1.5). Neither the term list nor the relationships need to be complete at this point. The list may evolve over time but should reach stability for one knowledge transfer cycle to be executed. The list may be produced with the help of the knowledge item catalog file ([KIC] Appendix O) (FR 6.1.1.3, 6.1.1.10). This can be accomplished by passing the list to employees for feedback and consolidating the produced lists afterwards (FR 6.1.1.4). An alternative process would be to use a wiki-type information system.

3. Consolidating knowledge item catalog: The knowledge engineer, with support of the project manager knowledge transfer, may continue to consolidate the knowledge catalog (FR6.1.1.4). After this, synonyms may be defined (FR 6.1.1.6), and knowledge items can be grouped together. Knowledge items which are team specific or cannot be grouped for some reason will remain in the knowledge item catalog individually for possible later reviews. The knowledge engineer also verifies the proposed relationships to knowledge areas.

4. Knowledge item catalog review: The consolidated list of knowledge items will be separately reviewed by each supervisor knowledge receiver or by the project manager knowledge transfer (e.g., in walkthrough reviews) (FR 6.1.1.4). A review template is provided in [REVIEWTEMPLATE] (Appendix V).

5. Knowledge item catalog distribution: At this point, the knowledge engineer will edit the knowledge item catalog based on the reviews and may add, remove or modify individual knowledge items. After the editing, the knowledge engineer will distribute a final version of the catalog to all supervisors knowledge receiver and project managers knowledge transfer.

6. Knowledge item catalog evaluation: Knowledge transfer sponsors will assess knowledge areas specified in the knowledge item catalog to assess their strategic importance for the firm; i.e., based on long-term importance or contribution to a firms specific competencies. They will then be designated with a high, medium or low value label (FR 6.1.1.8). Similarly, the supervisors of knowledge receivers will assess the identified knowledge items for their operational urgency (FR 6.1.1.7). Once these evaluations are complete, both supervisors and managers will meet to discuss any knowledge items differing in strategic vs. operational assessment (FR 6.1.1.9). The discussion should lead to a majority consensus regarding the knowledge item catalog as a whole. According to the majority-agreed knowledge item catalog, a list of knowledge items will be compiled for which concrete knowledge transfer implementations need to be planned (FR 5.2). Finally, supervisors and managers will agree on an event when to review the present knowledge item catalog regarding knowledge item appraisals and the knowledge items contained within the catalog.

7. Knowledge item catalog distribution: The knowledge engineer will then proceed to publish the knowledge item catalog – e.g., in an information system) (FR 1.5.2).

8. Knowledge item catalog review: When the review event occurs, the knowledge item catalog will be edited and modified for any additions, modifications or removals.

6.3.6.6 Tools

The knowledge items catalog can be shared either in Microsoft Excel file format, by means of a Wiki site or by e-mailing the data to all involved parties. An ideal tool would be a graph-based knowledge mapping tool, since it could illustrate the various relationships among knowledge items and knowledge areas. In addition, such a tool would be able to interface with information resources as they become available through the knowledge transfer initiative.

The sharing process may be facilitated by three different software solutions. A basic list such as the one provided in [KIC] may be maintained in a spreadsheet application. The file could be shared through folders that are shared with the relevant knowledge transfer participants. However, information regarding updates would have to be sent out separately in e-mails. A more convenient option would be an intranet portal with the knowledge items and knowledge area listed; such a portal would allow any combination of the aforementioned files and might be of use when assigning knowledge items to particular employees. The respective employees may even receive notifications regarding updates and changes to their assigned knowledge items. Some possible usage scenarios are described below.

Software function	Use case scenario
Workflow (FR 1.5.2.1, 1.5.2.4)	Each knowledge item is placed into a centrally managed list. Once the list is found to be reasonably complete. An e-mail to all participants (i.e., executives and supervisors) is triggered by the knowledge engineer referencing the list location and a link to prioritization form. Once the form is filled out by all parties, all responses are collected, pre-ranked, sent to the knowledge engineer, and the consolidation round is closed.
Portal (FR 1.5.2.1, 1.5.2.2, 1.5.2.3, 1.5.2.5)	To consolidate the various team knowledge catalogues a portal site could be used. The team links and integrates shared folders and other document stores and links these with knowledge items. Key indicators and project tasks relevant to the team are tracked through the portal. This tracking reveals daily progress. A search function allows the team members to search only through data relevant to them (scope of search).

Figure 6-13: Use case scenarios for a knowledge identification IT support software

Even more sophisticated software could directly support the resource planning and staffing of the knowledge transfer. Such a system would interface with personal information management software systems and transparently inform managers and supervisors regarding knowledge transfer status.

6.3.7 Advantages and disadvantages

The knowledge identification method component allows the knowledge transfer activities to become manageable. In addition, the method component produces an overview of the available and required knowledge of the IT sourcing participants. The development of the knowledge item catalog requires the firm to reflect on its knowledge. In this way, the firm gains a better understanding regarding their knowledge resources.

The production of a knowledge item catalog is rather resource intensive. The workload on knowledge engineers and the project manager are especially high. Both functions often require skilled employees who are not occupied with other projects. Finally, the knowledge items catalog would have to be integrated into an organizational knowledge management system. These integration activities would require additional resources.

6.3.8 Known usages

Taking cues from the large ontology efforts in, for example, the medical and military domains (Medline/NLM, Xinfosphere/Boeing (Uschold et al. 2003)), other firms (such as McKinsey & Company or Microsoft Corporation (Microsoft 2004)) have produced ontologies to improve the handling of information resources. Even smaller, rather conservative organizations, such as public service administration units in Zurich, have adopted ontologies. The knowledge item catalog represents an ontology of available knowledge similar to what is presently used in an increasing number of firms.

6.3.9 Related research

Given the wide use and extensive research on knowledge management and knowledge identification resulting from ontology researchers, this presented knowledge identification represents merely a specialization within the IT sourcing filed. However, more general ontology related research may be considered (Staab and Studer 2006). Particularly ontology engineering frameworks (incl. maintenance and periodic review) have been proposed. Gomez et al. (Gomez-Perez et al. 2005) provide a good overview of the existing approaches. To implement such an ontology engineering effort, respectively knowledge identification effort as part of an IT sourcing initiative utilizes suggestions from the field of project management and change management.

General planning aspects are covered prominently by Duncan (Duncan 1996) and an overview of change management related techniques has been provided by Nauheimer et al. (Nauheimer and al. 2005). Particularly with regard to consensus building activities during the consolidation steps change management techniques can be employed. Finally, the graphical representation of the knowledge catalog and a suitable data model have been suggested in detail by Smolnik (Smolnik 2006).

6.4 The knowledge transfer planning method component

6.4.1 Introduction

After the knowledge identification has produced a baseline for the knowledge transfer in the form of the knowledge item catalog, the knowledge transfer planning component will be invoked to plan the knowledge transfer implementation of the selected knowledge items. Therefore, a signed knowledge transfer manifest is produced at the end of this method component. This document can be used to express the commitment to a certain knowledge transfer implementation path.

6.4.1.1 Method component effort profile[79]

Role	Effort
Knowledge transfer sponsor	Est. 4-6h for each organizational unit Estimation criteria: Number of knowledge areas *.01h
Supervisor knowledge receiver	Est. 6-8h for each knowledge area Estimation criteria: Number of units in knowledge transfer * 4h
Project manager knowledge transfer	Est. 20-30h for each team in organizational unit Estimation criteria: Number of employees * Number of tasks * 0.5h
Knowledge receiver	Est. 4-6h for each knowledge item Estimation criteria: Number of tasks * 0.2h
Knowledge source	Est. 4-6h for each knowledge item Estimation criteria: Number of tasks * 0.2h
Supervisor knowledge source	Est. 4-6h for each knowledge item Estimation criteria: Number of tasks * 0.1h
Program manager	Est. 4-6h for each organizational unit Estimation criteria: Number of org. units in knowledge transfer * 0.5h

6.4.2 Naming

During the knowledge transfer planning method component, a knowledge transfer manifest document will be produced that provides guidance to work through the implementation stage of the knowledge transfer. Determining who the involved employees will be, assigning the required resources, and agreeing on milestone dates and achievements characterize this method component. Therefore, this method component is essential for any successful knowledge transfer initiative.

6.4.3 Purpose and motivation

When no direct schedule for these activities is provided for firms, knowledge management activities tend to be more easily disregarded (FR 6.1.2.1). Often, operational urgencies push aside

[79] The effort profile provides estimated typical workloads per role with regard to dyadic knowledge transfers. Actual figures may vary based on the estimation criteria and other factors.

the strategic activities and after a while, firms find that their strategic knowledge transfer initiatives did not progress as desired. Because of these observable conflicts between operational and strategic activities, it is best to manage the knowledge transfer as a separate project or sub-project within the general IT sourcing effort. Such a separation helps to shield the knowledge transfer from other activities.

The planning of the knowledge transfer is based on consensus and feedback. Most importantly the knowledge transfer objectives, defined by milestones, will be negotiated with the knowledge receiver, knowledge source and their supervisors. Despite this collaborative effort, the resulting objectives need to be kept and lead towards the knowledge transfer goals requested by the knowledge transfer sponsor and agreed with the program manager. In any event, the agreed objectives, measures, dates for archiving them, and other important agreements will be noted in a single document (FR 5.4). Even though the document will not become an overly formal contract approved by legal counsels, it will document the commitment between the involved parties to execute according to the plan. The specific commitment needs to be twofold. First, the knowledge source and knowledge recipient organizations will agree on certain availabilities (FR 6.1.2.3), activities (FR 6.1.2.1), and objectives rewarded with defined incentives and penalties (FR 6.1.2.6, FR 2.6). Second, the knowledge source and knowledge receiver will assure the knowledge transfer project manager of their commitment to deliver (FR 4.3.3.1) and acquire (FR 4.3.2.1) knowledge. Each knowledge item resulting from the previous knowledge identification work requires its own dedicated knowledge transfer planning.

6.4.4 Usage

The knowledge transfer planning activities help to find common ground in how to structure the up-coming tasks of the implementation stage. For many employees, knowledge transfer is an infrequent activity which they may not know how to do. Therefore, they require detailed guidance in terms of proper planning. In addition, employees often may not immediately identify the benefits of such a process. Information on of the reasons for the knowledge transfer (i.e., through cost/benefit analysis or personal benefit propositions as part of the knowledge transfer planning) can help employees to identify benefits (FR 1.6.4.1). Describing the personal advantages to the employees, such as developing a new career path, is recommended (FR 1.6.4.2). In fact, career development options for both knowledge recipient and knowledge source can increase the motivation levels of the knowledge transfer participants (FR 2.6.2). While the future role of the knowledge source is defined prior to the knowledge transfer, defining an attractive future role for the knowledge receiver during this phase can increase his or her motivation to take part. These intrinsic motivators are supported by additional financial incentives where necessary. All motivators are applied in equal volume and for each party (FR 2.6.3). In addition, the communication of the involved motivators (FR 1.6.4), intrinsic or financial, is recommended to reduce tension between the knowledge receiver and the knowledge source. Since the benefits of knowledge transfers are often delayed, the motivators are especially important. While some of the transferred knowledge may be applied rather quickly, some artifacts, such as documentation, may prove valuable only many months after the knowledge transfer concludes. Usually these situations require detailed documented knowledge that the knowledge receiver would not be able to memorize. Since the value for the individual is variable over time, the organization needs to manage the motivation actively (FR 2.6). Finally, the organization should consider positive and negative motivators (FR 1.6.2). For example, a knowledge source may not be allowed to enter a new role or receive a bonus before knowledge transfer targets are met.

6.4.5 Non-usage

In some firms, natural knowledge transfer cultures may have been established over time or through knowledge management organizations. These organizations may require a lesser degree of planning. In many cases, the only planning required concerns defining objectives and target measures. However, even though the planning is reduced, controlling the process progress continuously remains an important activity of the knowledge transfer project manager.

6.4.6 Course of action

The following sections will first describe an abstract process of the method component. This overview is followed by detailed role responsibilities, cooperation details and descriptions of the relevant activities.

6.4.6.1 Overview of activities

In summary, a process synopsis of the knowledge transfer planning method component is presented below. Figure 6-14 shows the most important aspects we are going to describe in this section.

Name	Knowledge transfer planning
Precondition	Specific knowledge item chosen for transfer
Result	A signed knowledge transfer manifest
Participating roles	Program manager Supervisor knowledge receiver Supervisor knowledge source Project manager knowledge transfer Knowledge source Knowledge receiver
Milestones	Knowledge receiver and knowledge source selected Knowledge source informed by supervisors knowledge source Knowledge item specification finished Schedule for knowledge transfer defined Knowledge transfer manifest signed
Tools	Excel table for risk analysis Word file for knowledge item specification Word file for knowledge transfer manifest Excel table for knowledge transfer program management
Frequency	Once for each knowledge transfer

Figure 6-14: Process synopsis of knowledge transfer planning

In cases where the knowledge source and knowledge receiver can be identified directly by any of the supervisors, the knowledge transfer may immediately start with knowledge item specification and schedule planning (including setting the knowledge transfer objectives and measurement criteria as milestones). These objectives could be formulated in terms of a framework contract as part of the overall IT sourcing contract. Corresponding negotiations should be led by a role familiar with the knowledge receiving organizations needs, such as the program manager of the knowledge receiving firm and a representative of the knowledge source firm.

As soon as the objectives are agreed upon, the knowledge source organization is required to inform their employees in detail regarding their future roles. At this time, the precondition regarding the knowledge source future career finally needs to be fulfilled. Following the information of the knowledge source and knowledge receiver the detail planning will start and finish by producing the knowledge transfer manifest. In some cases, the knowledge transfer manifest may become a formal contractual element within the framework contract. However, more often, the contract will remain less formal and primarily indicate the commitment between the involved employees.

6.4.6.2 Participant roles

Program manager: The responsibility of the program manager is to coordinate the various knowledge transfers (FR 4.1.2.1). Therefore, he or she will assign the detailed planning of knowledge transfers to the project managers of the knowledge transfer. In order to effectively motivate supervisors of knowledge receiver and project managers, the program manager may consider defining the knowledge transfer progress objectives as part of these roles' performance goals for a given period.

During the knowledge transfer planning, the program manager will have to implement the objectives determined by the knowledge transfer sponsor. He or she will have to determine and plan for the relevant resources and may negotiate the final objectives with the knowledge source organization (FR 1.6.1.).

Project manager knowledge transfer: The project manager knowledge transfer maintains responsibility regarding the resources and objectives of an individual knowledge transfer (FR 4.2.3.1), and balances any interaction between knowledge transfer participants (FR 2.5.4). Therefore, he or she will have to produce a reasonable plan to achieve the defined objectives with the available resources. Specifically, the project manager knowledge transfer will have to hold meetings and produce the actual knowledge transfer manifest document. Furthermore, he or she needs to lead the participants to a plan upon which they can agree. In order to discover likely risks, he or she can optionally conduct a risk analysis based on frequent problems regarding each knowledge transfer phase. More general project manager duties may be found in the organizations project management handbook.

Supervisor knowledge receiver: The supervisor knowledge receiver maintains the responsibility of ensuring the resources' availability for the duration of the knowledge transfer (FR 4.2.2.1). In addition, he or she may be asked to assess and select suitable employees as knowledge receiver considering their future roles with the receiver organization (FR 1.6.4.2).

Supervisor knowledge source: The supervisor knowledge source will define the future career path of the knowledge source following the knowledge transfer (FR 1.6.4.2). Furthermore, he or she will also have to ensure that the committed resources remain available for the duration of the knowledge transfer (FR 4.3.4.1, FR 1.6.1).

Knowledge source: The knowledge source will be asked to evaluate the chosen knowledge receiver informally regarding his or her perceived suitability to take over the defined knowledge (FR 2.1.1). In addition, the knowledge source will evaluate his or her own capabilities and assess whether he or she feels fit to reach the required knowledge transfer targets (FR 4.3.3.1). The individual's supportive and teaching skills should specifically be considered (FR 2.5.3). If any gaps are found, the knowledge source may first have to attend dedicated training or will be closely assisted by a knowledge transfer coach (FR 4.3.1) during the implementation stage.

Knowledge receiver: As soon as the knowledge transfer targets are agreed upon, the knowledge receiver will have to evaluate if he or she can achieve these targets (FR 4.3.2.1). The receiver may self-assess his or her listening, comprehension, and writing skills. In addition, he or she will have to judge whether the time frame chosen is reasonable. In case the timeframe is not adequate, the knowledge receiver may be asked to propose modifications, such as how he or she would be able to invest more time into the knowledge transfer; i.e., which current duties need to be suspended. If certain required trainable skills are lacking (e.g., such as a specific programming language), the knowledge receiver may first have to attend targeted trainings before entering the knowledge transfer.

6.4.6.3 Cooperation between roles

The program manager will maintain the oversight of all concurrent knowledge transfer initiatives (FR 4.1.2.1). He or she will be responsible for ensuring that they will all eventually reach the defined objectives. Therefore, he or she should have the authority to release funds or block funds for the payment of incentives, as well as to exercise pre-arranged penalty options (FR 2.2.1, FR 2.2.2).

Special attention is warranted regarding the operational integration of the knowledge transfer, specifically with respect to the IT sourcing context in general (FR 1.6). Some implementation stage method components (e.g., the tandem method component) require the knowledge receiver to be embedded in actual projects applying the acquired knowledge (FR 2.5.2). Representatives of these projects should to be involved in the planning process. Their involvement is recommended, because the knowledge application may result in additional complications since a less experienced individual is involved. Furthermore, the projects may have to be delayed slightly to wait for earlier knowledge transfer phases to complete. These project sponsors would then either have to be compensated for these complications, or the impact would have to be accepted by the project's sponsors. If no such projects could be found, specialized knowledge application projects could be initiated, such as refactoring of software or re-engineering of processes or simulations of any kind.

During the knowledge transfer manifest development (FR 5.4), suggestions from the supervisors of knowledge receiver and knowledge source regarding suitable knowledge receivers provide valuable information. The knowledge source, being an expert with regard to the knowledge item at hand, might find it easier to identify suitable candidates. Similarly, the supervisors of knowledge receivers will have in-depth knowledge of his or her employees' capabilities. This kind of support should be secured from the knowledge source organization (FR 4.3.3.1, FR 4.3.4.1). Furthermore, the project manager may consult the knowledge receiver and knowledge source regarding any possible favored partners. Since these individuals will have to work closely during the knowledge transfer, they should also ideally get along well.

During the planning process, openness and honesty is paramount while configuring the implementation stage method components. However, in certain circumstances, the knowledge source may result to be less cooperative. Even in this case, the constructive input regarding the method components configuration (especially regarding reasonable timing and work performance measures) needs to be provided by both the knowledge source and the knowledge receiver, ensured by the project manager (FR 4.2.3.1). The most important single contribution by the knowledge source during the knowledge transfer planning is the knowledge item specification document (FR 5.4.4).

6.4.6.4 Activities

1. Knowledge transfer coordination: The program manager will select one knowledge item at the time for each project manager knowledge transfer to start planning for, starting with the highest priority one (FR 4.1.2.1). He or she will list and track knowledge transfers in the knowledge transfer program file ([KTPRG] Appendix P) (FR 6.1.2.10) with a knowledge transfer identifier and a status description (FR 5.3.1).

2. Project plan development: Based on the knowledge item catalog, employee data or direct suggestion by a supervisor knowledge receiver a candidate pair of knowledge receiver and knowledge source will be selected (FR 5.4.1). The optional attributes of the knowledge item catalog [KIC] can support the project manager knowledge transfer in the selection process. Furthermore, an optional risk analysis profile ([RISKP] Appendix R) (FR 6.1.2.4) may help to identify likely causes of future problems and to further narrow down the reasons underlying a knowledge transfer need – in some cases highlighting alternative problem solutions. The optional knowledge item catalog fields and the risk analysis profile will also provide valuable information on how the implementation stage method components should be configured.

Once determined that no impeding issues exist, the project manager knowledge transfer needs to start completing the knowledge transfer manifest ([KTM] Appendix T) (FR 5.4, 6.1.2.9). First, the targeted knowledge objectives need to be described, based on the knowledge items derived from the knowledge identification. Following this, the project manager knowledge transfer should justify the knowledge receiver choice (e.g., based on the existing skill set, targeted job function or simply on his or her ability to learn). The justification needs to be provided even when the selected knowledge receiver is a specially hired new employee. In cases in which a knowledge receiver is specifically hired, it is advised to evaluate the learning abilities of the candidates in addition to any other recruitment evaluation criteria. The second item to document corresponds to the future roles of the knowledge source. The supervisor knowledge source needs to provide this information to the project manager knowledge transfer (FR 6.1.2.5). Once the designated knowledge source has been informed by the supervisor knowledge source and has been placed under supervision of the project manager knowledge transfer (FR 4.2.3.1), the project manager knowledge transfer will ask the knowledge source to produce the knowledge item specification ([KISPEC] Appendix S) (FR 5.4.4). Once completed, the knowledge item specification will become an integral part of the knowledge transfer manifest.

After the knowledge item specification has been provided by the knowledge source, the project manager knowledge transfer will begin to formulate individual milestone (FR 6.1.2.1) targets and intermediate targets (FR 5.4.2, 6.1.2.2). These targets need to be developed in agreement with the program manager and supervisor knowledge receiver to ensure that they meet the overall knowledge transfer objectives (e.g., targeted end and content of knowledge transfer). A proposed list of milestones and proposed measures will then be reviewed by the knowledge source and the knowledge receiver. Based on the review feedback, the milestones will be refined and the incentive and penalties, structured as agreed upon between program manager and supervisor knowledge source, will be included (FR 6.1.2.2).

Finally, the knowledge transfer manifest will summarize the knowledge receiver selection justification and the milestone schedule, including all sanctions and penalties, measurement and targets as well as future roles and starting date of the knowledge source (FR 6.1.2.9).

3. Knowledge transfer planning readiness: During a meeting of the project manager knowledge transfer, the program manager, knowledge source, and knowledge receiver the final knowledge transfer manifest will be discussed and any objections and comments will be recorded and addressed accordingly (FR 6.1.2.7). Particular attention should be given to timeline, targets, assigned resources, and measurements. Prior to a joint signing event, the finalized document should be sent to all participants for final comments. Based on the final knowledge transfer manifest, the program manager will start to reserve the required resources (FR 6.1.2.3); any required external training will be completed and the relevant information system infrastructure will be prepared (FR 1.5).

4. Implementation stage kick-off: At the beginning of the implementation stage, all involved parties, including the knowledge transfer sponsor gather to sign (FR 5.4.5) the knowledge transfer manifest (FR 6.1.2.8). A social environment should be provided to strengthen the sense of participatory achievement, so far and for the future. The presence of leading management personal, even those in executive roles, will likely increase the perceived importance of and motivation for the effort.

5. Steering the knowledge transfer: Once the implementation stage begins, the controlling function of the program office will track the knowledge transfer progress based on the defined milestone targets (FR 4.2.1.1, FR 2.2). To avoid delays, it is recommended that the project manager knowledge transfer and the program office representative attend the first few knowledge transfer meetings between knowledge source and knowledge receiver in person. Since knowledge transfer activities are easily neglected in favor for more urgent operational tasks, an aggressive project flagging and escalation strategy should be chosen (e.g., notification and supervisory involvement at once if milestones are delayed, and notification of management and executive if milestones are not reached, without prior consultation of the knowledge transfer participants).

6.4.6.5 Tools

The knowledge transfer planning method component requires three documents. In addition, a fourth document, the risk analysis profile [RISKP], is optional and helps to identify likely sources for knowledge transfer risks. The knowledge item catalog [KIC] records several optional attributes which help to identify configuration options of method components. The knowledge item specification [KTSPEC] document is employed to narrow down the scope of the knowledge transfer, to reference relevant information resources and to provide a seed source for the project manager to define milestones. Finally, all of the scheduling and administrative issues including availabilities, resources, targets, measures and so forth are merged with the aforementioned information into the knowledge transfer manifest [KTM].

The process of managing these documents can either involve a file sharing platform or an intranet software platform (FR 1.5.2.1, FR 1.5.2.2). The provided templates with this document are in Microsoft Excel and Microsoft Word file formats. Using an intranet portal system to assign certain tasks and to track the progress of document completion can reduce the management overhead of the project (FR 1.5.2.4). An ideal knowledge transfer information system would no longer employ documents, but would collect the required data points by issuing workflows to the relevant knowledge transfer participants. With regard to the general project management tasks a specialized project management software package may be used. The knowledge item specification in particular may require special document management software. A selection of usage scenarios is described below.

Software function	Use case scenario
Wiki (FR 1.5.2.1, 1.5.2.4)	Information that changes frequently and that can be changed by a wide variety of individuals is placed on a shared wiki site. This publication format allows knowledge to be contributed by a collection of knowledge sources and aggregated into a single information resource. Changes are easily traceable through the change history, which allows an earlier version to be restored with one click. Final versions can be protected against manipulation.
Document management & lists (FR 1.5.2.1, 1.5.2.5)	Release versions of documents, such as the knowledge item specification, which are meant to be changed only under certain circumstances, are placed into a version control system for documents. Authors are informed if changes are made and asked either to accept or reject these changes.
Workflow (FR 1.5.2.1, 1.5.2.4)	Each document is placed into a document management location. Once a review is required, the author starts a review workflow by clicking on a button. This action triggers an e-mail to all participants referencing the document to review and a link to the review form to be filled out. Once the form is filled out, all responses are collected, sent to the author, and the review is closed, following the majority consensus vote of the reviewers (i.e., release, release with modification, do not release).
Search (FR 1.5.2.2)	Information resources are distributed on a wide variety of file shares and web sites. Users can start a search through all data sources from one single search interface to facilitate the knowledge item specification production process.
Portal (FR 1.5.2.1, 1.5.2.2, 1.5.2.3, 1.5.2.5)	To consolidate the various knowledge transfers, a program manager configures a portal site. The team links and integrates file shares and other document stores. Key indicators and project tasks relevant to the team, possibly consolidated from dedicated project management software, are tracked through the portal. This tracking reveals daily progress.

6.4.7 Advantages and disadvantages

The presented planning process maintains the benefit of engaging all involved parties from the beginning. The process transparently outlines the reasons why a knowledge transfer implementation stage was developed. Degenerations and unreasonable planning are therefore less likely because the process can be easily observed by various peers. In addition, explicit knowledge transfer objectives given to the project manager knowledge transfer by the program manager, and agreed upon by the knowledge transfer sponsor and the program manager, ensure a chain of controllable targets. These targets form part of the knowledge transfer manifest and therefore reduce uncertainty regarding hidden agendas or motives that may arise in a less transparent planning process. Since all relevant knowledge transfer configuration aspects are documented, changes in the knowledge transfer plan when necessary can more easily be performed.

An important disadvantage is the structured collection of several parameters. The standardized approach severely reduces the freedom of participants' actions. The participatory planning approach also requires a significant effort because of the high number of participants.

6.4.8 Known usages

The knowledge transfer planning based on knowledge transfer contracts is used by firms such as Accenture (Swaminathan and Nebolsky 2005). Large German IT sourcing firms have been reported to plan knowledge transfer to a significant degree based on human resource activities and heavily rely on employee skill profiles. Our own experience has shown that strict control and tight resource planning are required. Otherwise, massive delays may occur.

6.4.9 Related research

The organization of the knowledge transfer planning method component relates strongly to general project management planning (Duncan 1996). The iterative process to create the knowledge transfer manifest and the focus to create employee commitment is based on the participatory management approach summarized by Vroom and Jago (Vroom and Jago 1988). More general change management techniques are presented by Nauheimer et al. (Nauheimer and al. 2005).

6.5 The self study method component

6.5.1 Introduction

The self study method component is based on the concept of knowledge receiver focused knowledge acquisition from explicit knowledge sources and information resources. The method component is designed to allow the knowledge receiver, rather than the knowledge source, to produce relevant and sufficiently detailed documents for him or her and the knowledge receiver organization. Therefore, typically the knowledge receiver is relatively heavily involved during this method component as he or she studies documents, asks questions and summarizes his or her findings in documents for later reuse.

6.5.1.1 Method component effort profile[80]

Role	Effort
Knowledge receiver	Est. 60-102h for each knowledge item Estimation criteria: Number of existing documents * 0.5 days + Number of undocumented knowledge item specification chapters * 17h
Knowledge source	Est. 5h for each knowledge item Estimation criteria: Number of existing documents * 0.1h + Number of undocumented knowledge item specification chapters * 2h
Program office	Est. 1-2h for each knowledge item Estimation criteria: Number of knowledge transfer participants *.04h
Project manager knowledge transfer	Est. 1-2h for each knowledge item Estimation criteria: Number of knowledge transfer participants *.04h

6.5.2 Naming

Since the self study method component focuses on the work of the knowledge receiver, a name was chose to reflect this. Although the knowledge receiver will not perform all work alone, he or she is the one expected to carry out the majority of the work. To create a reusable set of documents, the method component borrows from techniques such as the power pack and knowledge assets[81].

6.5.3 Purpose and motivation

The self study asks the knowledge receiver to analyze, comprehend and summarize the documents referenced in the knowledge item specification [KIPEC]. He or she will have to develop a summarized document of the provided information resources and may ask for the support of the knowledge source. The resulting summary document needs to be of sufficient

[80] The effort profile provides estimated typical workloads per role with regard to dyadic knowledge transfers. Actual figures may vary based on the estimation criteria and other factors.
[81] Compare 3.2.4

quality (FR 1.1.1). The document needs to describe all relationships to be understood by a third party in order to comprehend the knowledge item. Once finalized and reviewed, the document will be submitted to the documentation maintenance cycle ([DOCMAIN] Appendix M) (FR 3.6.1). This process aims to provide increased comprehension from structuring and analyzing existing explicit knowledge.

The knowledge receiver will be continuously supported by the knowledge source (FR 4.3.3.1). Because the knowledge receiver is asked to report his or her latest findings in a diary, the knowledge source will know when an intervention may be required (FR 6.2.1.4). The knowledge source has the opportunity to comment directly on a diary entry or suggest, through questioning rather than direct suggestion, additional issues to examine. The diary entries and comments will become even more important if experimentation (e.g., trying out different configurations of a software, testing behavior of a system) comprises a large part of the self study, since the knowledge source would have to watch out for misinterpretations of observed effects. The documentation and diary entries will provide a traceable result over time, which is often unavailable for mental activities such as knowledge acquisition.

6.5.4 Usage

The self study is best used in the beginning of a knowledge transfer during the preparation phase, to allow the knowledge receiver to familiarize him/herself with the existing knowledge. The self study is suitable for a supported discovery process, where the knowledge receiver works independently, but receives limited guidance. During the process, specific aspects of the knowledge item will be documented (FR 6.2.1.6).

It is important that the relevant documents and artifacts defined in the knowledge transfer manifest will be produced by the knowledge receiver individually (FF 6.2.1.1). If the knowledge receiver should not be familiar with a suitable documentation format, the knowledge source should provide a documentation template (e.g., an interface definition, a design template, or a static class framework) (FR 6.2.1.2). If a knowledge policy (FR 1.5.4) is in place, the knowledge policy of the knowledge receiver may specify a documentation template (FR 6.2.1.3)

In some circumstances, the project manager knowledge transfer may be tempted to ask the knowledge source to provide additional documentation. However, the temptation should be resisted whenever possible. Before asking the knowledge source to provide any documentation, an effort should be made to try to have the documentation developed by the knowledge receiver (FR 2.5.2). The knowledge receiver will, in most cases, provide better documentation, precisely because he or she is new to the subject at hand. This will make it easier for the knowledge receiver to identify all the issues he or she needs to document for a non-expert. A knowledge source is usually less sensitive to certain details and would omit these critical aspects required to understand the knowledge item entirely.

If baseline knowledge about the knowledge item has already been acquired by the knowledge receiver, the self study activities provide an opportunity to deepen the understanding of this knowledge. In addition, restructuring the documentation and making it more accessible to other employees provides an additional knowledge management benefit.

6.5.5 Non-usage

The self study is only a suitable activity if existing documentation can be provided and a prospective reuse of the product documentation can be expected (FR 3.6.1). In addition, if no maintenance, storage, or search facilities are available to manage the resulting document, the self study may well fall short of its potential benefit (FR 1.5.2). In these circumstances, it is often more effective to just transfer knowledge implicitly through means of the tandem method component.

The self study is not suited to produce documentation conforming to regulatory or standard-abiding documentation on its own, since it does not describe any specific documentation standard or editing and version tracking mechanism. Moreover, the method is not meant to produce such documentation in the first place. Strictly regulatory documents are more efficiently written by the knowledge source and archived, since reuse is seldom a concern in these cases.

6.5.6 Course of action

The following sections will first describe an abstract process of the method component. This overview is followed by detailed role and cooperation details and descriptions of the relevant activities.

6.5.6.1 Overview of activities

A process synopsis is provided to summarize the self study method component. Figure 6-15 shows the most important aspects we are going to describe in this section.

Name	Self study
Precondition	Signed knowledge transfer manifest planned for self study execution
Result	Documented summary and good understanding of explicit knowledge
Participating roles	Project manager knowledge transfer Program office Knowledge receiver Knowledge source
Milestones	Documentation complete Required documentation artifacts defined Summary documentation produced Questions and answers during self study documented Understating of explicit knowledge tested
Tools	Documentation systems (documentation templates, wiki, blog, etc.)
Frequency	Once for each knowledge transfer

Figure 6-15: Process synopsis of self study

6.5.6.2 Participant roles

Knowledge source: The knowledge source (FR 4.3.3) maintains the responsibility of periodically verifying the knowledge receiver's progress and alerting the project manager knowledge transfer if the need arises to intervene (FR 2.5.4), therefore providing indirect feedback to the knowledge receiver (FR 2.5.3). Depending on the organization of the knowledge transfer, the knowledge receiver and knowledge source may agree to interact directly before escalating an issue. The knowledge source is also responsible for providing all relevant existing documentation and/or updating the information provided as part of the knowledge item specification.

Knowledge receiver: The knowledge receiver (FR 4.3.2) will read and analyze the provided documentation. He or she alone is responsible for providing the targeted documents. He or she may ask the knowledge source to highlight particularly important documents or document sections (FR 4.3.2.1).

Program office: The program office (FR 4.2.1) tracks the quality of the produced documents by examining the targets defined in the knowledge transfer manifest (FR 4.2.1.1). If any targets are missed, the program office informs the project manager knowledge transfer first and the program manager afterwards.

Project manager knowledge transfer: If any issues are raised by the program office regarding the quality or delays of results, the project manager (FR 4.2.3) is responsible for evaluating options in either (FR 4.2.3.1). He or she is also responsible for resolving any interpersonal conflicts, allotting more time to complete the process, and/or reducing the quality or scope of the documentation. Any such adaptations of the original plan need to be authorized by the program manager.

6.5.6.3 Cooperation between roles

During the self study, participatory and solitary work sessions between the knowledge receiver and knowledge source are iterative. In most cases, the knowledge receiver will prepare documentation (FR 6.2.1.1) and relevant questions (FR 6.2.1.5) for a meeting with the knowledge source. Questions and documents may be submitted to the knowledge source prior to the meeting, allowing the knowledge source time during which to prepare.

Conflicts and impediments are to be resolved by the project manager knowledge transfer. The project manager knowledge transfer will also lead through the documentation acceptance review and conduct a final test of the knowledge source's understanding of the documentation. In some cases, the testing questions can be prepared by or even asked by the knowledge source.

6.5.6.4 Activities

1. Review information resource: The knowledge receiver will first verify that the information resources referenced in the knowledge item specification are complete and up to date. If newer versions can be obtained or additional documents emerge, these are provided by the knowledge source.

2. Define documentation format: Document either according to the firms documentation policy ([DESIGN] Appendix U) (FR 5.5, 6.2.1.2) or according to a knowledge source-provided documentation template (FR 6.2.1.3). Certain sub-milestones are defined between the project manager knowledge transfer, the knowledge source, and the knowledge receiver based on the [KISPEC].

3. Document: The knowledge receiver (FR 6.2.1.1) will begin to read through the provided documentation and document as far as possible. Emerging questions are either directed (FR 6.2.1.5) to the knowledge source or included in diary posts (e.g., through blog software) (FR 6.2.1.4). If questions are asked in face-to-face meetings, extra care is to be taken in documenting all of the questions and their respective answers after the meeting.

4. Review: Once one of the previously agree sub-milestones has been reached, the knowledge source will comment on the document and provide indications for improving the document when necessary. The knowledge source should also highlight sections that are well done and do not need further work. The knowledge source may initiate a meeting if he or she notices major errors.

5. Analysis cycle: The third and fourth steps are repeated until the knowledge receiver and knowledge source can agree to continue on to the next step.

6. Finalize: If all sub-milestones and targets are complete and the knowledge source judges the documentation to be complete and of good quality, the knowledge source and knowledge receiver will discuss setting up a suitable meeting with the project manager knowledge transfer to discuss the final document.

7. Final review and comprehension test: Once all targets in the knowledge transfer manifest have been achieved all method component participants will meet for testing the knowledge receiver's knowledge and to assess the summary document's quality (FR 5.6). The project manager knowledge transfer will test the knowledge of the knowledge receiver through transfer questions and direct questions relating to the provided documentation. The knowledge source may assist the project manager knowledge transfer in producing questions, or may ask questions directly. However, the judgment of the answers and the final acceptance of the test and the document review ([REVIEW] Appendix V) remain the sole authority of the project manager knowledge transfer.

6.5.6.5 Tools

To produce the required artifacts and documents, the right abstraction level needs to be established. Intermediate abstractions are most valuable in an IT sourcing context. Figure 6-16 shows an overview of possible abstraction levels, each with an intended target audience.

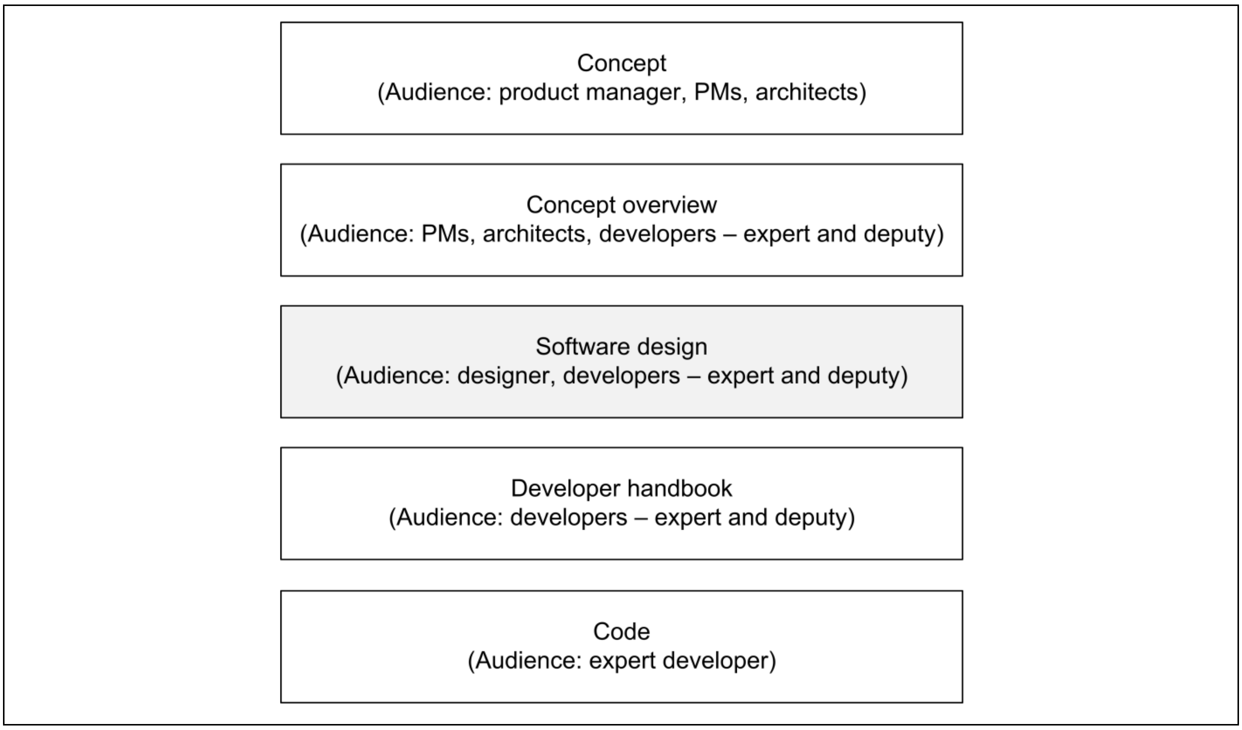

Figure 6-16: Documentation levels

This purely conceptual overview describes business functions, while the concept overview also shows business processes, systems, and logical as well as architectural elements, therefore merging technical and business documentation levels. The software design is again more technical and shows application-specific relationships between components of the software. The development handbook constitutes the first level of abstraction above the actual code. The development handbook therefore contains detailed descriptions regarding individual components and how to use and modify them.

The level that is apparently best suited for documentation produced as part of a knowledge transfer in an IT sourcing context is the software design (FR 5.5). The software design can be documented using the [DESIGN] template and provides a bridge between managing technical staff and developers. A developer handbook may serve as an intermediate step towards a software design, but should not be the sole documentation artifact. Additional documentation artifacts developed through the self study may also entail test procedures (i.e., code), frequently asked question lists, pictures, or videos. The results do not need to include only written documents. Usage scenarios for software solutions useful for the purpose of the self-study method component are listed in the following figure.

Software function	Use case scenario
Blog (FR 1.5.2.1, 1.5.2.5, 1.5.2.4)	A knowledge receiver notes experiences or discoveries during the self-study, possibly using key words for categories, in short articles. The articles are sorted in reverse chronological order. A knowledge source or others can leave comments to each article. Articles are not necessarily focused on one project but may include personal opinions.
Wiki (FR 1.5.2.1, 1.5.2.4)	Documents that changes frequently, such as design documentation in the beginning of its creation, is placed on a shared wiki site. This publication format allows knowledge to be contributed by a collection of knowledge sources and aggregated into a single information resource. Changes are easily traceable through the change history, which allows an earlier version to be restored with one click. Final versions can be protected against manipulation.
Document management & lists (FR 1.5.2.1, 1.5.2.5)	Release versions of documents, which are meant to be changed only under certain circumstances, are placed into a version control system for documents. Authors are informed if changes are made and asked either to accept or reject these changes.
Workflow (FR 1.5.2.1, 1.5.2.4)	Once a review of the created documentation is required by the knowledge receiver in preparation of a review meeting, the knowledge receiver starts a review workflow. This action triggers an e-mail to all participants referencing the document to review and a link to the review form to be filled out. Once the form is filled out, all responses are collected, sent to the author, and the review is closed.
Editing software	In addition software solutions focused on document production allow for the improvement of the self study method component. First, most of the Microsoft office programs, including drawing programs such as Visio, PowerPoint, or Word, allow users to comment on dedicated aspects and to color the respective elements. Many more specific solutions for software development allow even more sophisticated commenting and annotation features directly in an integrated development environment[82].

[82] The International Council on Software Engineering (INCOSE) provides an overview of such tools:

6.5.7 Advantages and disadvantages

The self study activities resemble an intuitive process which has been enriched by structural elements to track the knowledge transfer progress. The method component can be used in a wide range of situations.

Problems usually arise in formulating the questions for the final review and comprehension test, because a project manager knowledge transfer may not be able to do this without assistance. The continuous progress of the self study sometimes requires frequent and intense controlling efforts, particularly in cases when documentation and writing are not usually related to the job profile of the knowledge receiver.

6.5.8 Known usages

The outlined activities are not only used in primary education (e.g., high school), they are often employed at higher education organizations as well (e.g., seminar assignments). At our sponsor firm, we were able to use the self study method components or variants thereof in two teams.

6.5.9 Related research

It has been shown that that documentation would need to be studied in some form or another (e.g., handbooks, design documentation or actual source code) to convey the meaning of a given knowledge item within the information systems field, specifically in the software development domain (Corbi 1989; IEEE 1998). In addition, psychologists have discovered, that novices may be best to develop such documentation since they are less likely to employ overly abstract descriptions (Hinds et al. 2001). To support the documentation process the use of software tools is encouraged by Schwabe (Schwabe 2001) suggesting an electronically shared material to maintain a firm-wide memory.

http://www.incose.org/ProductsPubs/products/rmsurvey.aspx

6.6 The tandem method component

6.6.1 Introduction

The tandem method component reflects the concept of working cooperatively to achieve a shared goal. The component builds on a structured process during which responsibility for a defined task of a knowledge item is transferred from the knowledge source to the knowledge receiver. The process moves from a master-apprentice relationship in the beginning to a client-advisor relationship in the end.

6.6.1.1 Method component effort profile[83]

Role	Effort[84]
Knowledge receiver	Est. 15-20h for each task transferred Estimation criteria: Time to test task execution + execute task + time to compile questions and answers
Knowledge source	Est. 8.5h for each knowledge receiver supported Estimation criteria: Number of supporting knowledge receivers * 8.5h
Program office	Est. 1-2h for each knowledge transfer controlled Estimation criteria: Number of controlled knowledge transfers * 1h
Knowledge transfer coach	Est. 5-10h for each employee coached Estimation criteria: Number of coached employees * 2h
Project manager knowledge transfer	Est. 1-2h for each managed knowledge transfer Estimation criteria: Number of managed knowledge transfers * 0.5h
Generic project manager	Est. 1-2h for each managed knowledge transfer Estimation criteria: Number of managed knowledge transfers * 0.2h

6.6.2 Naming

The tandem method component combines a series of similar knowledge transfer techniques, such as mentoring (in all its variants), "buddy support of novice", and "on the job training". All of these techniques are often specified as independent methods[85]. For the tandem method component, we use the best of these techniques. The naming underlines the focus on participatory work and shared responsibility. Therefore the hand-over of responsibility aims to establish the knowledge receiver as a knowledge hub within the knowledge receiver's firm. Similarly to riding a tandem bicycle, which cannot move forward unless both parties keep pedaling and maintain the course, the tandem method component cannot advance knowledge transfer if one of the participants stops cooperating.

[83] The effort profile provides estimated typical workloads per role with regard to dyadic knowledge transfers. Actual figures may vary based on the estimation criteria and other factors.
[84] Effort estimated for each week of knowledge transfer.
[85] Compare 3.2.5

6.6.3 Purpose and motivation

The most important principle of the tandem method component is the assumed equality of a knowledge source and a knowledge receiver (FR 2.6.3) and working in a participatory fashion (FR 2.5). This implies that the knowledge source accepts responsibility for the knowledge receiver's actions even during a brief period of time – when the knowledge source remains responsible but the knowledge receiver starts executing a defined task. The shared responsibility should resolve the sense of competition in the knowledge transfer team through clearly defined goals (FR 6.1.2.2). The project manager or coach should actively try to limit attempts by any participant to gain a positional advantage. We maintain that the execution of the tandem method component may in fact benefit the knowledge source too. He or she may discover aspects of the knowledge item being transferred that he or she may have forgotten.

The tasks the knowledge receiver will start to execute need to be carefully observed by the knowledge source in order to objectively judge the work performance without resorting to demeaning behavior. Before the tandem method component, the knowledge source will be responsible for all tasks. When certain work performance targets are met and the tandem method component starts, the knowledge receiver takes over the execution, while the knowledge source remains responsible. After meeting additional performance targets, the knowledge receiver will share the responsibility with the knowledge source and finally, after meeting even more work performance targets, the knowledge receiver takes over all responsibilities (FR 2.5.1). While the individuals may share responsibility, the contractual obligations of the knowledge source organization are only assumed by the knowledge receiver organization at the last step.

6.6.4 Usage

The tandem method component is primarily used when a very experienced knowledge source needs to transfer knowledge to a rather junior knowledge receiver. The participants need to display a certain degree of empathy in order to overlook small mistakes and to accept criticism of their own work. People who are willing to work in the same office usually are sufficiently good partners. Similarly, people responding to critiques constructively by suggestion to "think it over" are usually sufficiently suited. An ability to formulate questions is especially important for the knowledge receiver.

The method component tandem is less well suited for the first part of the knowledge transfer process (i.e., preparation phase), because it does not yield many documents. The method component is better suited for later phases such as the transition phase and possibly the integration phase.

6.6.5 Non-usage

The tandem method component should not be used with employees who have a history of not working independently and who tend to allow others to solve issues for them. A certain degree of curiosity and commitment is required. Difficult situations may arise when both the knowledge source and the knowledge receiver are unable to voice constructive criticism; i.e., suggesting alternative solutions. While the tandem method component can be used with strong personalities, it is not recommended if the degree of dominance between the two people differ too much; i.e., one person's suggestions are continuously disregarded by the other person.

If a knowledge-receiving organization is unable to negotiate equal incentives for the knowledge source as for the knowledge receiver, asymmetric incentives may arise, which may hurt the concept of equality at work in the tandem method component.

6.6.6 Course of action

The following sections will first describe the abstract process of the method component. This overview is followed by detailed role and cooperation details, and finally the descriptions of relevant activities.

6.6.6.1 Overview of activities

In summary, the tandem method component can be described in terms of a process synopsis. Figure 6-17 shows the most important aspects we are going to describe in this section.

Name	Tandem
Precondition	The available explicit knowledge has been understood
Result	Operational responsibility taken over from the knowledge source firm
Participating roles	Project manager knowledge transfer Program office Generic project manager Knowledge transfer coach Knowledge receiver Knowledge source
Milestones	Experiences from early task execution documented Task related problems solved and solutions documented Work performance targets reached Knowledge item documentation updated
Tools	Document management system (incl. templates, wiki, blog, etc.) Enterprise search Collaboration environment (forum, virtual meeting room)
Frequency	Once for each knowledge transfer

Figure 6-17: Process synopsis of tandem

6.6.6.2 Participant roles

Knowledge source: The knowledge source (FR 4.3.3) is responsible for supporting the project manager knowledge transfer by assigning sub-milestone tasks for the knowledge receiver. Furthermore, the knowledge source will observe and review the knowledge receiver's work performance indirectly (FR 6.2.2.3). Therefore he or she is asked to intervene subtly and indirectly by suggesting improvements to the knowledge receiver, without implementing them him/herself. He or she is always available for questions, but may direct the knowledge receiver to documentation that may contain the answers to certain questions (FR 4.3.3.1).

Knowledge receiver: The knowledge receiver (FR 4.3.2) is asked to prove and apply his or her knowledge in direct work assignment tasks. He or she is encouraged to ask the knowledge source whenever he or she feels unsure about anything (FR 4.3.2.1).

Project manager knowledge transfer: The project manager knowledge transfer (FR 4.2.3) needs to ensure that the knowledge transfer manifest targets, specifically the work performance targets, are reached (FR 4.2.3.1). Initially the knowledge receiver will perform many tasks more slowly than the knowledge source. This additional task duration needs to be planned for. Specifically the temptation to replace the knowledge receiver with the knowledge source should be resisted if delays occur because of the longer task duration for the knowledge receiver. If delays cannot be compensated at all, the program manager may be consulted if any of the agreed penalties are to be applied. The project manager knowledge transfer is held responsible for the knowledge transfer performance of the program manager.

Program office: The program office (FR 4.2.1) will observe the work performance of the knowledge receiver and inform the project manager knowledge transfer regarding his or her performance (FR 4.2.1.1). If work performance milestones fail, the project manager is informed first, before the program manager is informed.

Generic project manager: The generic project manager is responsible for coordinating the business project into which the knowledge receiver needs to be integrated (FR 1.6). He or she needs to ensure the timely conclusion of a business project. Within The Method, he or she is expected to offer opportunities to the knowledge receiver within the business projects so that the receiver can practice some tasks related to his or her knowledge item.

Knowledge transfer coach: In many knowledge transfer initiatives, operational issues tend to distract from the knowledge transfer. The knowledge transfer coach (FR 4.3.1) will assist the project manager knowledge transfer, the program manager, and the supervisor knowledge receiver, as well as the generic project manager in finding solutions to deal with any conflict (FR 2.5.4) and with any knowledge management policy issues (FR 4.3.1.1). This conflict resolution is especially important when errors by the knowledge receiver, which are to be expected, are not dealt with constructively. In these cases the knowledge transfer coach is required to mediate and help to restore a balanced work environment. Furthermore, the knowledge transfer coach will assist the knowledge receiver and the knowledge source with all aspects of the relevant software tools and knowledge management policy aspects, such as required documentation formats and storage locations.

6.6.6.3 Cooperation between roles

The knowledge transfer coach will be available during the whole process of responsibility transfer to the knowledge receiver. His or her coaching involves intense collaboration with the knowledge source. Especially if the knowledge source thinks the knowledge receiver needs more direct support, the knowledge transfer coach mediates between the two and tries to create a direct working relationship (FR 2.5.4). Once the tandem starts, the project manager knowledge transfer needs to ensure that both the knowledge receiver and the knowledge source find the required time to prepare the responsibility hand-over (FR 1.6.3.2). One way to ensure sufficient time could be to formally place the knowledge source and the knowledge receiver on vacation and have them perform their knowledge transfer activities away from their daily work environment. The program office will be monitoring the status, and will inform the project manager knowledge transfer if the knowledge receiver gets side-tracked or is held up by operational issues (FR 2.2.4). The program office will also critically observe whether the knowledge source is supporting, rather than limiting, the knowledge receiver's learning process – and therefore this role is usually staffed by the knowledge receiving firm (FR 2.2.1). If any signs of frustration or discomfort are noticed with the knowledge receiver, the knowledge transfer coach may be asked to mediate. In any case, the project manager knowledge transfer will have to ensure, that both the knowledge receiver and the knowledge source are rewarded and penalized to the same extent. Especially during the three-phase responsibility hand-over, the pre-arranged process and reward schema need to be maintained (FR 2.6.3).

The knowledge receiver will execute all tasks on his or her own as far as possible (FR 2.5.2). If any questions arise that he or she cannot answer by studying the previously created documentation, he or she will ask the knowledge source for advice. Questions may be e-mailed or asked through a diary to maintain a record of the question and the answer. The knowledge source may rephrase the question to ensure proper understanding of the question. Once the question is clear enough, the knowledge source may answer either through e-mail or the diary. Should a face-to-face meeting be required, the knowledge receiver will have to record the answer after the meeting and combine the question with the answer. The knowledge source should reference existing documentation in his or her answer whenever possible (FR 2.5.3).

Although good planning and analysis should prevent any knowledge transfer from aborting, it may happen that a knowledge receiver proves to be unsuitable to take over responsibility. In this case the knowledge transfer may be aborted. Taking in account the availability of a knowledge source, a new knowledge transfer should be planned. Such an abort during the tandem is the worst abort scenario, because the documentation prepared in the self study and many of the documented experiences in the tandem may have to be repeated in some form, and the invested time and resources are lost almost entirely without much of a result.

Finally, once the tandem is completed, and the knowledge receiver has taken over the responsibility entirely, the knowledge receiver becomes responsible for maintaining the documentation according to the firm's documentation policy (compare [DOCMAIN] Appendix M for an example) prepared in the self study (FR 3.6.2). This could mean, for example, updating the documentation with the insights gained from the tandem.

6.6.6.4 Activities

1. Shared responsibility: The tandem begins once the knowledge receiver has demonstrated sufficient knowledge that he or she can be trusted with actual execution of tasks in relation to the knowledge item (FR 2.1.1). As soon as the knowledge receiver starts applying his or her knowledge, the knowledge source is responsible for tracking his or her work performance - especially the quality of work and the speed of execution - and for intervening pro-actively whenever necessary. That said, the knowledge source needs to intervene carefully so as to not patronize or otherwise alienate the knowledge receiver. Difficult interventions are best done only after consulting the knowledge transfer coach. During this activity, both individually, the knowledge receiver and the knowledge source are held accountable in equal terms by their organizations (FR 6.2.2.1). Though, the knowledge source's firm will still be responsible for the service on contractual terms until an agreed handover milestone is reached. One such milestone may be reaching a work performance target at a sufficient level, as defined in the manifest performance measures for the knowledge transfer (FR 5.6, 6.2.2.4). Upon reaching a set performance target the next activity step starts.

2. Temporary hand-over of responsibility: As the knowledge receiver demonstrates sufficient work performance (FR 2.1.2), he or she takes over responsibility on an entirely temporary basis (FR 6.2.2.1). Should his or her work performance slip below a certain threshold, the knowledge source will always be prepared to take back any of the relevant tasks immediately. During this activity, while the knowledge receiver is held accountable within the knowledge transfer initiative, the knowledge source's firm will still be accountable for the service as a whole. If the work performance remains stable as defined in the knowledge transfer manifest, the next step is entered.

3. Final hand-over of responsibility: Once the work performance measures meet the required stability as defined in the knowledge transfer manifest (FR 5.6), the knowledge receiver takes over complete responsibility for the knowledge item and all related tasks (FR 6.2.2.1). As soon as this decision is made the knowledge source organization will no longer be accountable for the service, and the knowledge-receiving firm will have to take over full accountability. The knowledge receiver will update any documentation prepared earlier and become responsible for the knowledge item documentation according to [DOCMAIN] (FR 3.6.2). In particular, all questions and answers during the tandem activities are to be recorded in a "frequently asked questions" document.

6.6.6.5 Tools

A collaboration platform can help to store many of the less structured data items resulting from questions and answers during the tandem method component. The diary, in particular, may be implemented using blog software to store questions, answers, and comments. Depending on how the self study documents are stored, the same platform should be used for storing any additional artifacts produced as part of the tandem activities. The following table illustrates some usage scenarios of an information system supporting the tandem method component.

Software function	Use case scenario
Blog (FR 1.5.2.1, 1.5.2.5, 1.5.2.4)	The knowledge receiver can note experiences, discoveries and ask questions on the blog platform. The knowledge source can observe these blog articles and judge the knowledge acquisition progress, provide additional information and answer questions when possible.
Document management & lists (FR 1.5.2.1, 1.5.2.5)	The knowledge receiver can file problems and questions in a list-based format and categorized under suitable topic headings. Once the knowledge receiver discovers a solution, this solution can be directly attached. Alternatively, the knowledge source may provide an answer or solution to questions or problems. This process can generate a list of frequently asked questions with regard to the knowledge item.
Portal	For each knowledge item being transferred a portal site can consolidate

Software function	Use case scenario
(FR 1.5.2.1, 1.5.2.2, 1.5.2.3, 1.5.2.5)	all relevant documents produced during the previous self-study activity. Changes to these documents could be tracked automatically and interested parties may be informed automatically of changes; i.e., through an e-mail notification. The portal may also aggregate any knowledge transfer measures and project progress indicators. A search function allows the team members to search only through data relevant to knowledge item currently relevant.

Without a central portal, many of these data items would have to be managed in spreadsheets stored on file shares, significantly reducing the transparency and reducing the opportunities to automate at least some of the administrative tasks.

6.6.7 Advantages and disadvantages

The greatest benefit of the tandem method component is the integration of the knowledge receiver into the daily project business, even though the environment is tightly controlled at first. The knowledge receiver is thus directly able to show his or her understanding of the knowledge.

In addition, the tandem method component is a very effective way to transfer much of the unstructured, implicit knowledge such as experiences. Through pro-active feedback during the first and second activity steps, the knowledge source is able to transfer some of his or her experience, while the knowledge receiver will be able to gain some own experiences at the same time. Since the tandem method component demands the recording of such information in a diary of questions and answers some of the implicit knowledge is transformed into explicit knowledge.

The tandem method component requires considerable management effort, especially with difficult personalities. Dominant characters require more frequent reminders to respect their colleagues. Insecure knowledge receivers may not work sufficiently independently and may lack the drive to search for answers for themselves, therefore requiring more reminders to work a bit longer towards a solution. Knowledge receivers showing less than average knowledge acquisition abilities may lead the knowledge source to become frustrated in light of the latter’s inability to understand a given issue. To be sure, the project manager knowledge transfer may need to remind the knowledge source that the speed of picking up knowledge also depends on the knowledge source’s ability to teach.

6.6.8 Known usages

The tandem method components and their various related techniques are frequently employed at consulting firms to teach new consultants regarding process and customs at the firm[86]. The software company Microsoft uses a similar, review-based partner system to train new developers in approximately three months to a level where they can be allowed to work on shipping software code[87].

6.6.9 Related research

Based on research of Stasser et al. (Stasser et al. 1989) the tandem method component establishes a small team (usually of two, accounting for the knowledge transfer coach three) to conduct knowledge transfer more effectively. Furthermore, the principle of building trust over time through demonstration of skill proposed by Mc Knight et al. (McKnight et al. 1998) is followed thoroughly. In addition, the responsibility is transferred in an orderly manner conforming to common IT sourcing demands (Crowston 1997; Venkatesan 1992).

[86] Compare section 3.2.4 for detailed references.
[87] Private communication with a senior developer manager at Microsoft.

6.7 The ad hoc reflection method component

6.7.1 Introduction

The ad hoc reflection is designed according to the idea of an open, solution-driven discourse among a group of equal individuals. Each ad hoc reflection is intended to be performed right after a work engagement, in contrast to the project reflection which is executed after a whole project is finished. The method component is based on the after action review activity developed by the US Army[88].

6.7.1.1 Method component effort profile[89]

Role	Effort
Moderator	Est. 2-4h for each method component execution Estimation criteria: Number of participants * 2min + 2h preparation and finishing
Knowledge receiver	30min for each method component execution
Knowledge source	30min for each method component execution
Program office	30min for each method component execution
Employees	30min for each method component execution
Assistant	Est. 2-4h for each method component execution Estimation criteria: Number of participants * 2min + 2h preparation and finishing

6.7.2 Naming

The ad hoc reflection was developed by the US Army in the 1970s[90]. It was originally designed as a post-scenario review technique for training. During the 1990s the method was adapted by several firms independent of any methodological procedure model. The use presented here as part of The Method is intended for situations where a group of people needs to learn from mistakes and proven practices in order to derive a set of best practices for future reference in a positive, solution-oriented atmosphere.

6.7.3 Purpose and motivation

The ad hoc reflection method component entails reflection on experiences and sharing of these experiences with a group of colleagues involved in a similar activity. The repeated execution of ad hoc reflection allows the knowledge receiver to strengthen his or her knowledge base and a deputy knowledge receiver may emerge from among his or her colleagues (FR 6.2.3.1).

[88] Compare section 3.2.4 for detailed references.
[89] The effort profile provides estimated typical workloads per role with regard to dyadic knowledge transfers. Actual figures may vary based on the estimation criteria and other factors.
[90] Compare section 3.2.4 for detailed references.

The ad hoc reflection is different from the project reflection. While the project reflection is designed to be performed after a whole project, the ad hoc reflection is designed to be executed immediately after a given activity (FR 6.2.3.2). The ad hoc reflection meeting includes all hierarchy levels involved in an activity, including the initiating management. The meeting is executed such that hierarchical rank is no longer relevant (FR 6.2.3.3). One participant is excluded from material discussion and serves as moderator. All results are recorded for later distribution and storage (FR 6.2.3.7).

6.7.4 Usage

During the ad hoc reflection two possible usage scenarios are suggested. If the activity on which the ad hoc reflection is to be applied involves a large emotional component, the ad hoc reflection should be used immediately after the activity. If a rational solution search is necessary, the ad hoc reflection may be performed as late as the day after the activity.

The ad hoc reflection method component focuses on sharing experiences. Primarily to strengthen the knowledge of the knowledge receiver, making him or her explain relationships between observed effects and the underlying cause. In addition, the knowledge source transfers some additional knowledge as he or she reflects on the relationship between actual events and previous ones. The experiences are shared with colleagues to allow the practices to be stored in organizational memory via the reflection report. Through the repeated execution of the ad hoc reflection activities, the concentration of knowledge in a single individual is mitigated. Therefore the ad hoc reflection allows the transfer of knowledge from one or more knowledge sources to one or more knowledge receivers – a beneficial side effect of the method component. In particular, a knowledge transfer of best practices (FR 6.2.3.4).

An open and honest communication is mandatory for successful ad hoc reflection (FR 6.2.3.6). Mistakes cannot be exploited for blaming individuals and the moderator should intervene in such situations (FR 6.2.3.5). More precisely, results from the ad hoc reflection meetings should never be used for the purposes of employee assessment.

6.7.5 Non-usage

Without a clear event to be discussed, the ad hoc reflection is difficult to use. The method component is particularly ill-suited to structuring or organizing experiences. For structuring experiences the project reflection method component is better suited. The information on the facts of a given activity to be discussed should therefore be well known to all participants. In addition, ad hoc reflection meetings can be executed only with employees willing and capable of surrendering their hierarchical position (FR 6.2.3.3). Ranking managers may have to ensure the participants through specific acts that the employee assessment process will be independent of any ad hoc reflection discussion. Suitable tactics are to symbolically drop employee badges at the door prior to the meeting or to preemptively hold pending employee performance review meetings prior to an ad hoc reflection meeting to ease the tension.

Ad hoc reflection meetings are also difficult to run with overly dominating personalities. If such employees are part of the group of people, the method component should not be used, because of the relatively non-authoritarian nature of the ad hoc reflection method component. In these cases a project reflection may be an option.

6.7.6 Course of action

The following sections will first describe an abstract process of the method component. This overview is followed by details of roles and cooperation and finally the descriptions of the relevant activities.

6.7.6.1 Overview of activities

In summary, the ad hoc reflection method component can be described in terms of a process synopsis. Figure 6-18 shows the most important aspects we are going to describe in this section.

Name	Ad hoc reflection
Precondition	Responsibility for tasks related to the knowledge item taken over by the knowledge receiver
Result	Ad hoc reflection report
Participating roles	Moderator Program office Assistant Knowledge source Knowledge receiver Employees
Milestones	Planned activity execution understood Actual activity execution determined Deviations and their root cause identified Ad hoc reflection report produced
Tools	Ad hoc reflection report template, projector, whiteboard, pinboard
Frequency	Repetitively, depending on demand.

Figure 6-18: Process synopsis of ad hoc reflection

6.7.6.2 Participant roles

Moderator: The moderator (FR 4.2.5) is chosen by the group. Each time, the moderator should be rotated to ensure that not the observations of one individual are systematically excluded. The moderator does not engage in any discussion, but helps his or her colleagues relate to the experiences (FR 4.2.5.1). Therefore knowledge source and receiver should not be chosen as moderators, even though some knowledge sources may be good at moderating by asking the right questions and guiding the group towards conclusions without mentioning them him/herself. The moderator closes the meeting after 30 minutes and ensures that participants have the opportunity to express themselves Assuming 5 min of speaking time, group size should be 4-5 people.

Program office: The program office (FR 4.2.1) ensures that the assistant produced the ad hoc reflection report, stores and distributes it according to the firm's knowledge management policy.

Assistant: The assistant (FR 4.3.6) records any information during the ad hoc reflection meeting and afterwards produces the ad hoc reflection report (FR 4.3.6.1).

Knowledge source, knowledge receiver, and employees: All employees (FR 4.3.5) who took part in the activity under discussion - either the knowledge source (FR 4.3.3), the knowledge receiver (FR 4.3.2), or otherwise - join the meeting. All meeting participants are encouraged to participate. The moderator is meant to prevent passive participation (FR 4.2.5.1).

6.7.6.3 Cooperation between roles

The goal of the ad hoc reflection method components is to exchange knowledge in an immediate work situation. All participants are usually members of the new knowledge source's organization, the organization that just assumed responsibility. The former knowledge source may be present from time to time. The ad hoc reflection produces a report ([REXT] Appendix W).

During the meeting the participants discuss their unsuccessful and successful practices and actions. Problems and mistakes are addressed, but with a focus on how to solve, prevent and perform better in the future. The moderator is responsible for stopping discussions not focused on solutions. An ad hoc reflection meeting should not last longer than 20 minutes plus about 10 minutes of time for administrative issues. Four questions need to be addressed during the meeting:

First: What was the planned action?

Second: What did happen?

Third: Why did we deviate from the planned action?

Fourth: What can we improve in the future?

If any discussion gets dead-locked because of personal differences the moderator should resolve the situation through dedicated questioning techniques such as: open-ended questions, probing questions, and avoidance of why questions, since they often imply a conclusion, against which a defense is likely to be provoked. Questions involving what, when, where, and how are good.

The assistant will visibly note any information on behave of the moderator in order to allow the moderator to focus entirely on managing the discussion. Upon conclusion of the ad hoc reflection the assistant verifies the correctness of the displayed information on the whiteboard, pinboard or projected data and produces the ad hoc reflection report accordingly using the [REXT] template.

6.7.6.4 Activities

1. Schedule ad hoc reflection meeting now or on the next day: The meeting participants are informed of the time, location, and ad hoc reflection content (FR 6.2.3.2).

2. Produce the right atmosphere: The meeting atmosphere for an ad hoc reflection is most successful if it is characterized by openness and a drive to contribute to the group (FR 6.2.3.6). Hierarchical rank is discarded and a relaxed environment is dominating (FR 6.2.3.3). The US Army describes an atmosphere where "you strip your rank off at the door". Participants are assured that no individual performance aspects will be recorded.

3. Explain the rules: All participants are reminded of the rules of the meeting: No hierarchy, no blame game, allow people to finish talking, no new problems, search for a solution, and active participation.

4. Choose moderator: The moderator is picked from among the participants by majority vote and it should not be the one who moderated at the last meeting (FR 6.2.3.5) or either the knowledge source or knowledge receiver.

5. Determine what has been planned: The moderator begins by asking "What was meant to happen" and aims to reach a set of ordered activities that should have been executed.

6. Determine what actually happened: The moderator now asks for a list of activities that did happen. Only facts are relevant at this point.

7. Compare plan with execution: Now the plan will be compared with the actual execution and the discussion will focus on what might have been the reasons for any deviations. This comparison, together with the reasons for any deviation, may result in a more favorable activity execution plan.

8. Meeting conclusion: Now that a better practice has been found, the practice and the reasons for its adaptation are recorded. All participants express whether they agree to the better practice and if they do, the assistant is asked to finalize and distribute the ad hoc report [REXT] (FR 5.7, 6.2.3.7).

6.7.6.5 Tools

A simple ad hoc reflection is best supported by a chart, whiteboard, or pinboard. To structure the ad hoc notes a laptop including a beamer and presentation software to quickly draft drawings and text are recommended. If the room size permits, direct editing into the [REXT] template may be helpful. The choice of the meeting support tools largely depends on the number of participants, time frame, and depth of the analysis. One suitable set of tools may be group support tools such as Group Systems II by GroupSystems[91]. In addition, ad hoc meeting results might be stored electronically. Some scenarios are described in the following table.

Software function	Use case scenario
Wiki (FR 1.5.2.1, 1.5.2.4)	The ad hoc report can be shared through a wiki in order to allow all participants to review the ad hoc report content. Changes can either be permitted by the participants or accepted through review feedback. Once the content is approved by all participants the ad hoc report may be share with the entire company.
Portal (FR 1.5.2.1, 1.5.2.2, 1.5.2.3, 1.5.2.5)	A structured overview of all ad hoc reports, possibly organized according to knowledge areas and knowledge items may help to find relevant best practices or error avoidance practices. Similarly a search function may be employed.

6.7.7 Advantages and disadvantages

The ad hoc reflection is one of the few method components that allow knowledge transfer between groups. A structured reflection regarding the tasks relevant to the knowledge item is possible. These activities, in addition to the immediate knowledge transfer value, support the establishment of a knowledge-sharing culture.

However, the ad hoc reflection is a relatively time-consuming method component, because many people, including managers, may have to stop their normal activities to join a spontaneous ad hoc reflection meeting. In addition, depending on the timing of the activity, these meetings may occur during difficult times of the day; i.e., early in the morning on the weekend of a software release.

[91] GroupSystems provides detailed product information on its web site (http://www.groupsystems.com/) and recently renamed the product to ThinkTank.

6.7.8 Known usages

The US Army and several other government agencies report the use of the underlying After Action Review activity after training and combat situations. Firms such British Petroleum use the ad hoc reflection, as does General Motors.

6.7.9 Related research

The ad hoc reflection method component is based in large parts on the US Army after action review described for a corporate context by Darling et al. (Darling et al. 2005). The after action review has previously been described in extensive detail by Morrison and Meliza (Morrison and Meliza 1999) after the original instructions were published by the US Army Command (USAC 1993). To mitigate the effects form hidden profiles described by Stasser (Stasser and Titus 2003) we described a series of techniques to mitigate adverse effects by employing suitable question formulation techniques and coaching. Furthermore, the ad hoc method component follows suggestions by psychology researchers that groups are better at recalling knowledge (Hinsz 1990), and that repeated interaction in groups may eventually result in shared information (Larson et al. 1994).

6.8 The project reflection method component[92]

6.8.1 Introduction

The project reflection is designed according to the idea of an open, solution-driven discourse among a group of equal individuals. The method component is based on the after action review activity designed by the US Army. However, in contrast to the ad hoc reflection, the project reflection involves a more formal type of after action review. Since ad hoc reflection and project reflection are very similar, the method component description below should seem familiar. However, notice the activity section is rather different between the two method components. Even through the theoretical foundations are very similar.

6.8.1.1 Method component effort profile[93]

Role	Effort
Moderator	Est. 4-6h for each method component execution
Employees	Est. 4-6h for each method component execution
Knowledge transfer sponsor	Est. 4-6h for each method component execution
Assistant	Est. 4-6h for each method component execution

6.8.2 Naming

The roots of the project reflection can be traced to the US Army in the 1970s. It was originally designed as a post scenario review technique for training. During the 1990s the method was adapted by several firms independent of any methodological procedure model. The use presented here as part of The Method is intended for situations where a group of people needs to learn from mistakes and proven practices to derive a set of best practices for future reference in a positive, solution-oriented atmosphere. The project reflection analyzes a whole project or a whole project phase.

6.8.3 Purpose and motivation

The project reflection is intended to capture experiences and lessons learned from a specific project (FR 6.2.4.2). These experiences should be made available to the firm's knowledge base (FR 6.2.4.5). Regular use of the project reflection should steer the firm towards necessary change and thereby establish the foundations for continuous knowledge management.

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[92] The project reflection method component has been entirely produced (except some minor adaptations) by the piloting informant ME2 based on the ad hoc reflection method component.
[93] The effort profile provides estimated typical workloads per role with regard to dyadic knowledge transfers. Actual figures may vary based in the estimation criteria and other factors.

After each project, or after each project phase, all project participants involved (including the project sponsor) will gather in a large meeting. The meeting is conducted in a relaxed atmosphere. A moderator leads the meeting and does not participate in any discussion, but simply assists by asking questions and by helping others to remember (FR 6.2.4.4). All meeting results are recorded transparently (FR 6.2.4.5).

6.8.4 Usage

The project reflection method component primarily focuses on sharing experiences, often those of a knowledgeable project member as they reflect on current projects events and previous ones. The experiences are shared with colleagues to allow the structured storage of the practices in an organizational memory. Through the repeated execution of the project reflection activities, the concentration of knowledge in any single individual is mitigated. Therefore, the project reflection allows the transfer of knowledge from one or more knowledge sources to one or more knowledge receivers.

Open and honest communication is required for a successful project reflection. Mistakes cannot be exploited for blaming individuals. More precisely, results from the project reflection meetings should never be used for the purposes of employee performance evaluation.

6.8.5 Non-usage

Without a concrete project to be discussed, the project reflection is difficult to use. The information on the facts of a given activity to be discussed should therefore be well known to all participants. In addition, project reflection meetings work best with employees willing and capable of surrendering their hierarchical position. Leading managers may have to ensure the participants through specific acts that the employee performance review process will be independent of any project reflection discussion. Suitable tactics are to symbolically drop employee badges at the door prior to the meeting, or to hold pending employee performance review meetings prior to an ad hoc reflection meeting in order to ease the tension.

6.8.6 Course of action

The following sections will first describe an abstract process of the method component. This overview is followed by details on roles and cooperation and finally the descriptions of the relevant activities.

6.8.6.1 Overview of activities

In summary, the project reflection method component can be described in terms of a process synopsis. Figure 6-18 shows the most important aspects we are going to describe in this section.

Name	Project reflection
Precondition	A sponsor is prepared to run the project reflection and the project team is committed to participate in the project reflection.
Result	List of experiences, list of improvement measures
Participating roles	Knowledge transfer sponsor Moderator Assistant Employees
Milestones	Project reflection prepared Project reflection announce by sponsor Meeting rules communicated Experiences collected and sorted Improvement measures collected Project reflection finished
Tools	Projector, whiteboard, pinboard
Frequency	Repetitively, ideally after each project milestone.

Figure 6-19: Process synopsis project reflection

6.8.6.2 Participant roles

Moderator: The moderator (FR 4.2.5) is chosen by the group. The moderator should be a different person each time. The moderator does not engage in any discussion, but helps his or her colleagues to relate to the discussion (FR 4.2.5.1). Therefore, knowledge source or receiver should not become moderators, even though some knowledge sources may be able to moderate effectively by asking the right questions and guiding the group towards conclusions.

Assistant: The assistant (FR 4.3.6) records any information during the project reflection meeting and produces the project reflection report afterwards (FR 4.3.6.1).

Employees: All employees (FR 4.3.5) who took part in the project under discussion join the meeting. All meeting participants are encouraged to participate. The moderator should prevent passive participation (FR 4.2.5.1).

Knowledge transfer sponsor: The sponsor (FR 4.1.1) initiates the project reflection. He or she is the primary driver of the knowledge acquisition.

6.8.6.3 Cooperation between roles

The goal of the project reflection method components is to exchange knowledge after a work situation (FR 6.2.4.2). All participants are usually members of the new knowledge source's organization, the organization just taking over responsibility. The former knowledge source may be present from time to time. The project reflection will produce a list of project improvement measures (FR 6.2.4.1).

During the meeting the participants discuss their unsuccessful and successful practices and actions. Problems and mistakes are addressed, but with a focus on how to solve and prevent them in the future. The moderator is responsible for stopping discussions not focused on solutions. Four questions need to be addressed during the meeting:

First: What was the planned action?

Second: What did happen?

Third: Why did we deviate from the planned action?

Fourth: What can we improve in the future?

If any discussion becomes dead-locked because of personal differences, the moderator should resolve the situation through dedicated questioning techniques such as: open-ended questions, probing questions, and avoidance of why questions, since they often imply a conclusion, against which a defense is likely to be provoked. Questions involving what, when, where, and how are good.

The assistant will visibly note any information on behave of the moderator in order to allow the moderator to focus entirely on managing the discussion. Upon conclusion of the project reflection, the assistant verifies the correctness of the displayed information and produces the project reflection report.

6.8.6.4 Activities

1. Schedule a project reflection meeting: The meeting participants are informed of the time, location, and project reflection content. All participants are sent preparation documents containing the agenda, instructions for the group work, and the meeting rules: no hierarchy, no blame game, allow people to finish talking, no new problems, search for a solution, and active participation (FR 6.2.4.4).

2. Introduction: The sponsor starts by introducing the reason and the importance of the project reflection.

3. Agenda: The moderator continues by introducing the agenda and reminding all participants of the rules of the meeting. Following the agenda, the moderator will divide the participants into several groups, with each group focusing on one aspect of the project (e.g., along the engineering disciplines of requirements engineering, change management etc.) (FR 6.2.4.3).

4. Group work: Each group breaks up into separate rooms and begins to collect positive experiences on green cards and items with additional improvement potential on blue ones. The discussion of each group is facilitated by the moderator (FR 6.2.4.3).

5. Consolidation: All participants meet again after the group work has finished. The moderator asks one representative of each group to quickly present each of the identified issues and then position the card according to project management topics (e.g., communication, controlling, budget, etc.) on a pin board. The assistant takes a photo to capture the atmosphere during the presentation of each issue. Once completed, the moderator goes through each card and asks the participants for possible improvement measures (FR 6.2.4.1). The assistant records the measures on a whiteboard.

6. Meeting conclusion: The moderator closes the agenda item and the sponsor will offer closing comments (FR 6.2.4.3). The assistant takes photos of the whiteboard and pinboard for the inclusion into the project reflection report.

7. Finishing up: The assistant compiles a report (FR 5.7, 6.2.4.5), and the sponsor reviews the suggested improvement measures and sees to their implementation.

6.8.6.5 Tools

A project reflection is best supported by a chart, whiteboard, or pinboard. To structure the notes, a laptop including data projector and presentation software to quickly draft drawings and text are recommended. The choice of the meeting support tools largely depends on the number of participants, time frame, and depth of the analysis.

In addition project reflection meetings results might be stored electronically. Some scenarios are described in the following table.

Software function	Use case scenario
Wiki (FR 1.5.2.1, 1.5.2.4)	The project reflection report can be shared through a wiki in order to allow all participants to review the content. Changes can either be permitted by the participants or accepted through review feedback. Once the content is approved by all participants the project reflection report may be shared with the entire company.
Portal (FR 1.5.2.1, 1.5.2.2, 1.5.2.3, 1.5.2.5)	A structured overview of all project reflection reports, possibly organized according to knowledge areas and knowledge items may help to find relevant best practices or error avoidance practices. Similarly, a search function may be employed.

6.8.7 Advantages and disadvantages

The project reflection is one of the few method components that allow knowledge transfer between groups. A structured reflection regarding the project execution related to the knowledge item is possible. These activities, in addition to the immediate knowledge transfer value, help to establish a knowledge-sharing culture.

However, the project reflection is a relatively time-consuming method component, because many people, including managers, may have to stop their normal activities to join such a reflection meeting. In addition, only knowledge related to project execution is transferred and stored.

6.8.8 Known usages

The project reflection has been successfully executed at least three times at the sponsor firm, and has proven valuable to the participants.

6.8.9 Related research

The project reflection is conceptually similar to the ad hoc reflection. However, an important difference is the timing. Therefore, the project reflection is more closely related to post-project reviews (von Zedtwitz 2002). In addition, the project reflection, through its similarity with the after action review, can serve as a light weight change management tool to introduce knowledge management into an organization (Nauheimer and al. 2005).

7 Deployment and evaluation

The method for knowledge transfers in IT sourcing initiatives as presented in the previous chapter is the result of continuous practitioner evaluation during the pilot research and incorporation of best practices found through a series of case studies (compare 5.3). Even though the method presented here has not been applied to the fullest extent, the previous version has been used to a large extent in our second pilot phase. These second-phase pilots showed overall success in applying the method. In addition, the sponsor firm claims to have been able to reduce the contract volume by a few tens of millions of CHF in the two years that our research has been applied. Furthermore, the method presented in its original German text (compare (Voigt et al. 2007b)) has undergone two extensive reviews by academics and field experts (Appendix Z). The first review included project managers, team supervisors, and senior researchers. After the review, all change requests were applied and resulted in the first version of The Method. The second review was conducted on the presented method in German and also included project managers, managers, team supervisors, and senior researchers.

More formally, once the reviewers' requests for changes were addressed, we administrated an evaluation survey to the project participants, in which we asked the questions illustrated in Figure 7-1 and we asked respondents to answer on a ten-point Likert scale (1 - best, 10 - worst)[94]. Of the four project participants, three provided a written answer to our question. We could not survey more project participants, because during the course of the project, two participants left the sponsor firm and other participants had not read the documentation for The Method, meaning that they were incapable of assessing the final result.

Question	C2	C29	ME2	Average
1. How good do you think The Method is able to facilitate a knowledge transfer?	4	3	3	3.33
2. How do you perceive the practical usability of The Method?	3	4	3	3.33
3. Would you recommend The Method to a colleague or friend?	1	2	1	1.33

Figure 7-1: Responses to participant survey

[94] Our questions relate to the NCSB satisfaction measures which have recently been reconfirmed to remain among the most reliable and valid measures. Specifically: question one relates to the repurchase intention construct, question two relates to the overall satisfaction construct and question three relates to the recommendation intention construct. Compare: Keiningham, T.L., L. Aksoy, B. Cooil, T.W. Andreassen, L. Williams. 2008. A holistic examination of Net Promoter, 79-90.

This evaluation shows that practitioners with reasonable knowledge of The Method (i.e., experts) concluded that The Method is able to facilitate knowledge transfer. Therefore, The Method is able to guide an effective knowledge transfer. In addition, with regard to financial effectiveness, the method helped save approximately 50% off an IT sourcing contract by empowering knowledge receiver employees in a backsourcing initiative. Furthermore, the respondents expressed a high likelihood of recommending The Method to other peers. This indicates their conviction that The Method is indeed of adequate quality, since few people recommend low quality items to other people. This holds especially true for professional and socially close people such as colleagues and friends. This group of people may come back at the recommender if a recommendation turned out to be bad. Finally, we also observed an above median rating from practitioners regarding the practical use of The Method. This suggests that the field perceived the documentation quality and the support tools to be sufficient for actual use, rather than only of abstract guidance. Therefore, The Method seems fit for every day knowledge transfer in IT sourcing initiatives.

Executives of the sponsor firm, including the CIO and procurement executives, confirmed to us that they see potential for The Method to be applied not only in IT sourcing initiatives, but in regular employee training as well. Therefore, we seem to have designed a practical theory that potentially can be replicated not only within its intended target context, but also in other, related situations.

8 Conclusion, limitation and implications

The presented research in this thesis has successfully combined two research streams to develop a practical new theory. In specific, existing knowledge transfer process theory and IT sourcing theory have been combined to produce a useful and well grounded theory of knowledge transfer in IT sourcing initiatives, expressed in terms of a consistent method. Apart from the novel theory being developed, our work contributes to the field of IT sourcing specifically, because we observed the client perspective with unique detail.

The following section will examine the limitations of our research approach and show the specific implications for the relevant academic community and practitioners alike.

8.1 Limitations

With respect to our case study research we can only report on the questions being asked during our interviews and on what respondents answered. Despite our greatest efforts to avoid any misunderstandings and coding errors, there might have been misunderstandings or omissions we cannot account for. Therefore our results may reflect only a limited perspective on knowledge transfer, and additional details may exist, which we did not cover. However, our question and coding schema is based on several hundred case studies analyzed during the literature research to reduce the risk of missing important aspects. In fact, the opposite may be a greater risk. We might have overrated some issues in the case study results. However, by conducting case studies as well as pilot studies we were well prepared to balance observations appropriately. Furthermore, most of our cases concerned small and medium Swiss firms, primarily within the financial services industry. Our results may not be transferable to other industries. However, we did observe a few larger and non-financial services cases, therefore we reduced the risk of producing an entirely industry specific result.

Regarding our pilot research, we were able to only report on actual observations. There might be additional relevant aspects which we did not observe. However, we are confident to have covered a sufficient degree of the problem at hand, because our set of informants included two separate teams, represented the whole hierarchy and contained vendor and client opinions. Some aspects might still remain undiscovered, but through the extensive coverage these are unlikely to alter the method materially. Moreover, our research focused on dyadic one-time knowledge transfers. Therefore, the presented research may not be useful for repeated knowledge transfers or for knowledge transfers between groups. Although the final method components do include activities possibly suitable for knowledge transfers between groups, and have been successfully applied to groups in more than one case, such types of knowledge transfers have not been directly targeted.

This research excluded any human resource issues and intentionally did not study any cultural influence factors of knowledge transfer. This simplification of research scope may lead to entirely different results when observing knowledge transfers in other firms, industries or even different countries. Although many researchers have suggested that culture does influence knowledge transfer, we decided to exclude this concept, because it would have been impossible to study the method in all possible cultural contexts. We rather accept this limitation and are hopeful that further research may uncover the required adaptation for a cross-cultural use of the proposed knowledge transfer method.

8.2 Research implications

Our research extends the research regarding outsourcing, specifically regarding knowledge transfer in IT sourcing initiatives. Instead of developing new IT sourcing theories, we chose to relate to the work of Cullen et al. (Cullen et al. 2006) and extended their process framework with regard to managing knowledge transfer. Our extension of the existing IT sourcing process framework is grounded in the work of Szulanski (Szulanski 1999) and adapts his process to fit into the specialized domain of IT sourcing. In presenting our contribution in terms of a method we are allowing our theory to become easily applicable and testable. However, large scale empirical test were not the aim of this research. We hope that future work and the test of time of practical use will show which aspects of the proposed method need adaptations and how these adaptations may look like.

We perceive our primary contribution to provide a starting point for the emerging research field of knowledge transfer within IT sourcing contexts. Our contribution allows a successful and consistent knowledge transfer at least for the specialized case of IT backsourcing. Furthermore, we are contributing to the field of method construction and method engineering. To our knowledge, this research is the first to design all the required method elements described by Braun et al. (Braun et al. 2005). Despite a few recent publications citing the original article by Braun et al. such as Back et al. (Back et al. 2007), the focus is either on the analysis of one single method component, or on the analysis of existing methods using the framework described by Braun et al. Our comprehensive method element design, to our knowledge, represents a unique contribution to the field of method engineering[95].

It is invariantly possible that the method as presented may contain aspects that do not hold true to many other scenarios, and therefore should be changed and adapted to better match these circumstances. However, our contribution remains significant even given this limitation. Without the presented method, there would be no possibility for future research to begin modifying theory to match other circumstances.

8.3 Managerial implications

Practitioners may find that our research allows them to improve their IT sourcing agreements and relationships. Whenever an employee transfer is not possible to transfer the critical knowledge from one firm to another, our method provides guidance on how to structure the knowledge transfer between employees of both firms. Client managers may find that our method helps them to better plan and estimate costs of the IT sourcing transition at the beginning and the end of an IT sourcing initiative. Likewise, the information of the expected costs will reduce the planning uncertainty for the client and enable him or her to decide more objectively if and how to switch from one IT sourcing vendor to another.

Vendor managers may find that clients would welcome an estimated cost for any possible contract termination, including the transfer of knowledge back to the client or to a different vendor. Including this information may increase the clients trust in the vendor's true client focus. Additionally, the vendors would demonstrate considerable trust in his or her own abilities to provide sufficiently satisfying service as to not prompt a client to switch to another vendor.

In any event, practitioners will find that starting off with the proposed method as guidance to knowledge transfer will significantly reduce the planning overhead for knowledge transfers. We have not only provided a procedural framework, but offer a consistent set of documents to be delivered and filled-out as well as a set of roles to be filled. Furthermore, the proposed method provides a step-by-step guide on how the provided document should be produced.

[95] A Google Scholar search revealed that until the end of 2009 only 29 other articles referenced Braun et al.. Of these articles only one article by Back, et al. implements the entire set of method components.

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10 Appendix

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See companion CD-ROM:
Appendix/Appendix B - Coding Table x1.2.doc

See companion CD-ROM:

Appendix/Appendix – C Case Study Evidentiary Database x0.41.1.xlsx

See companion CD-ROM:
Appendix/Appendix D - Survey Design of Swiss Financial Service Companies on Knowledge Transfer for Outsourcing initiatives x0.18.doc

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	Oberes Management	Mittleres Management	Unteres Management	Kein Management	Erfahrener Kunde	Unerfahrener Kunde	Grosser Deal	Mittlerer Deal	Kleiner Deal	Langer Deal	Mittel langer Deal	Kurzer Deal
Occurance per Case (Unit of Observation: Case)	x	x	x	x	x	x	x	x	x	x	x	
Frequency Among All Cases	20	7	2	2	18	7	12	8	6	12	10	0
Percentage of Cases	153.85%	53.85%	15.38%	15.38%	138.46%	53.85%	92.31%	61.54%	46.15%	92.31%	76.92%	0.00%
On Average/Code Probability	1.538462	0.538462	0.153846	0.153846	1.384615	0.538462	0.923077	0.615385	0.461538	0.923077	0.769231	0
Standard Deviation												
Significance compared to other codings												
Percentage in Cases of same size												
Total Occurance (Unit of Observation: Code)												
Frequency Among All Cases	0	0	0	0	0	0	0	0	0	0	0	0
Percentage of Cases	153.85%	53.85%	15.38%	15.38%	138.46%	53.85%	92.31%	61.54%	46.15%	92.31%	76.92%	0.00%
On Average/Code Probability	0	0	0	0	0	0	0	0	0	0	0	0
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0
Significance compared to other codings												
Percentage in Cases of same size												
	Mehrfachnennung OK											

	Internes/Captive Sourcing	Externes Outsourcing	Totales Insourcing	Selektives/Smart Sourcing/Outtasking	Totales Outsourcing	Value-added Outsourcing	Transitional Outsourcing	Co-Sourcing	Insourcing	Outsourcing	Backsourcing	Single-Sourcing
Occurance per Case (Unit of Observation: Case)	x	x		x	x	x	x	x		x	x	x
Frequency Among All Cases	3	22	0	13	10	22	6	1	0	25	1	20
Percentage of Cases	23.08%	169.23%	0.00%	100.00%	76.92%	169.23%	46.15%	7.69%	0.00%	192.31%	7.69%	153.85%
On Average/Code Probability	0.230769	1.692308	0	1	0.769231	1.692308	0.461538	0.076923	0	1.923077	0.076923	1.538462
Standard Deviation												
Significance compared to other codings												
Percentage in Cases of same size												
Total Occurance (Unit of Observation: Code)												
Frequency Among All Cases	0	0	0	0	0	0	0	0	0	0	0	0
Percentage of Cases	23.08%	169.23%	0.00%	100.00%	76.92%	169.23%	46.15%	7.69%	0.00%	192.31%	7.69%	153.85%
On Average/Code Probability	0	0	0	0	0	0	0	0	0	0	0	0
Standard Deviation	0	0	0	0	0	0	0	0	0	0	0	0
Significance compared to other codings												
Percentage in Cases of same size												
						Mehrfachnennung OK						

	Multi Sourcing	Infrastruktur Outsourcing	Application Outsourcing	Business Process Outsourcing	Onshore/Domestic Sourcing	Nearshore Sourcing	Offshore Sourcing	Erstes Outsourcing	Wiederholtes Outsourcing	Erfolgreiches OS	Erfolgreicher WT
Occurance per Case (Unit of Observation: Case)	x	x	x	x	x		x	x	x	x	x
Frequency Among All Cases	9	7	15	8	24	0	1	13	11	15	10
Percentage of Cases	69.23%	53.85%	115.38%	61.54%	184.62%	0.00%	7.69%	100.00%	84.62%	115.38%	76.92%
On Average/Code Probability	0.692308	0.538462	1.153846	0.615385	1.846154	0	0.076923	1	0.846154	1.153846	0.769231
Standard Deviation											
Significance compared to other codings											
Percentage in Cases of same size											
Total Occurance (Unit of Observation: Code)											
Frequency Among All Cases	0	0	0	0	0	0	0	0	0	6	4
Percentage of Cases	69.23%	53.85%	115.38%	61.54%	184.62%	0.00%	7.69%	100.00%	84.62%	115.38%	76.92%
On Average/Code Probability	0	0	0	0	0	0	0	0	0	0.461538	0.307692
Standard Deviation	0	0	0	0	0	0	0	0	0	1.30384	1.095445
Significance compared to other codings											
Percentage in Cases of same size											
		Mehrfachnennung OK									

UD.1 (Customer, Provider)

UD.2 (Customer, Provider)

UD.3 (Customer, Provider)

UD.4 (Customer, Provider1, Provider2)

SK.1 (Customer, Provider)

SK.2 (Customer, Provider)

SK.3 (Customer, Provider)

CN.1 (Customer, Provider)

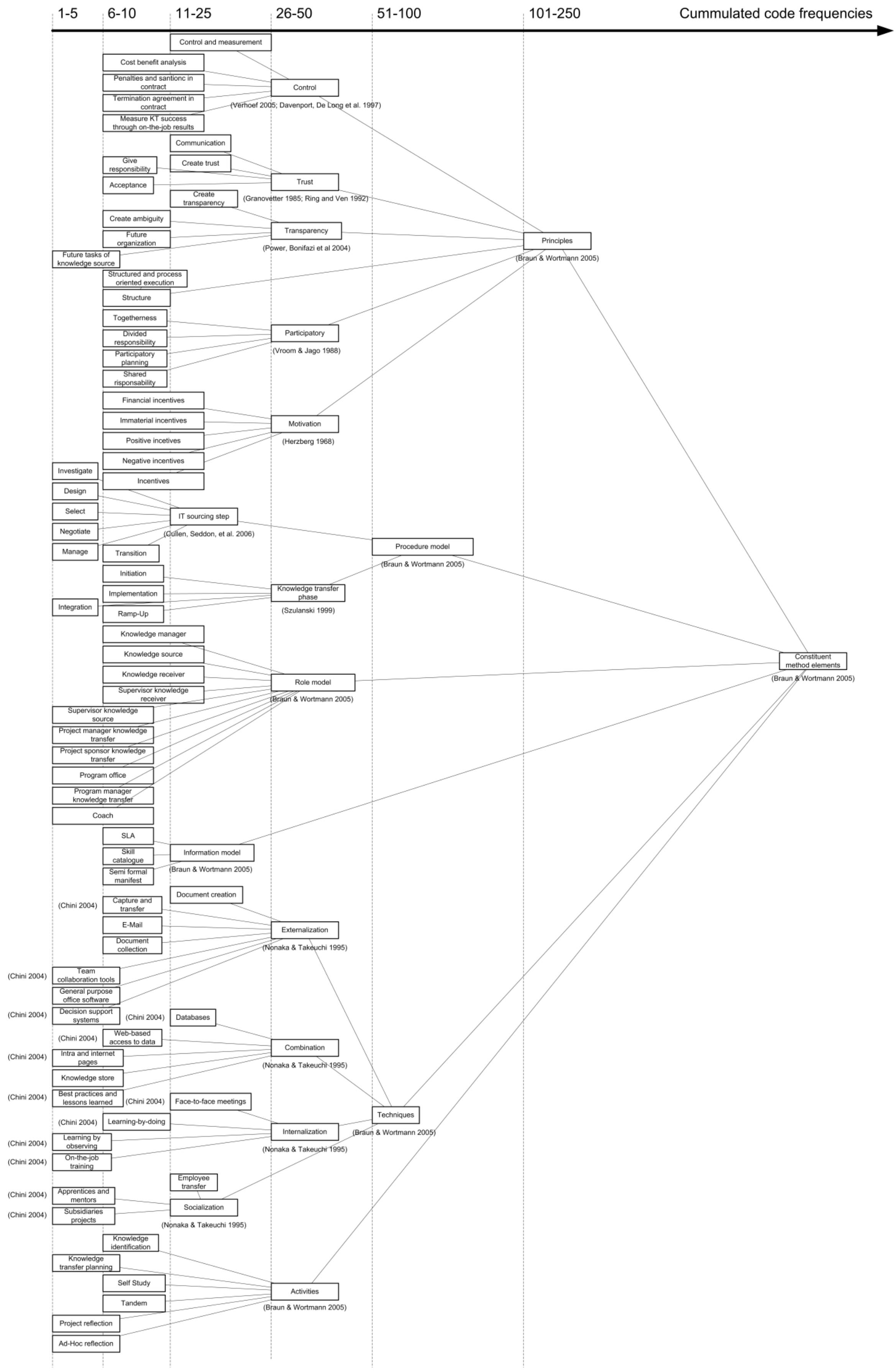
CN.2 (Customer, Provider)

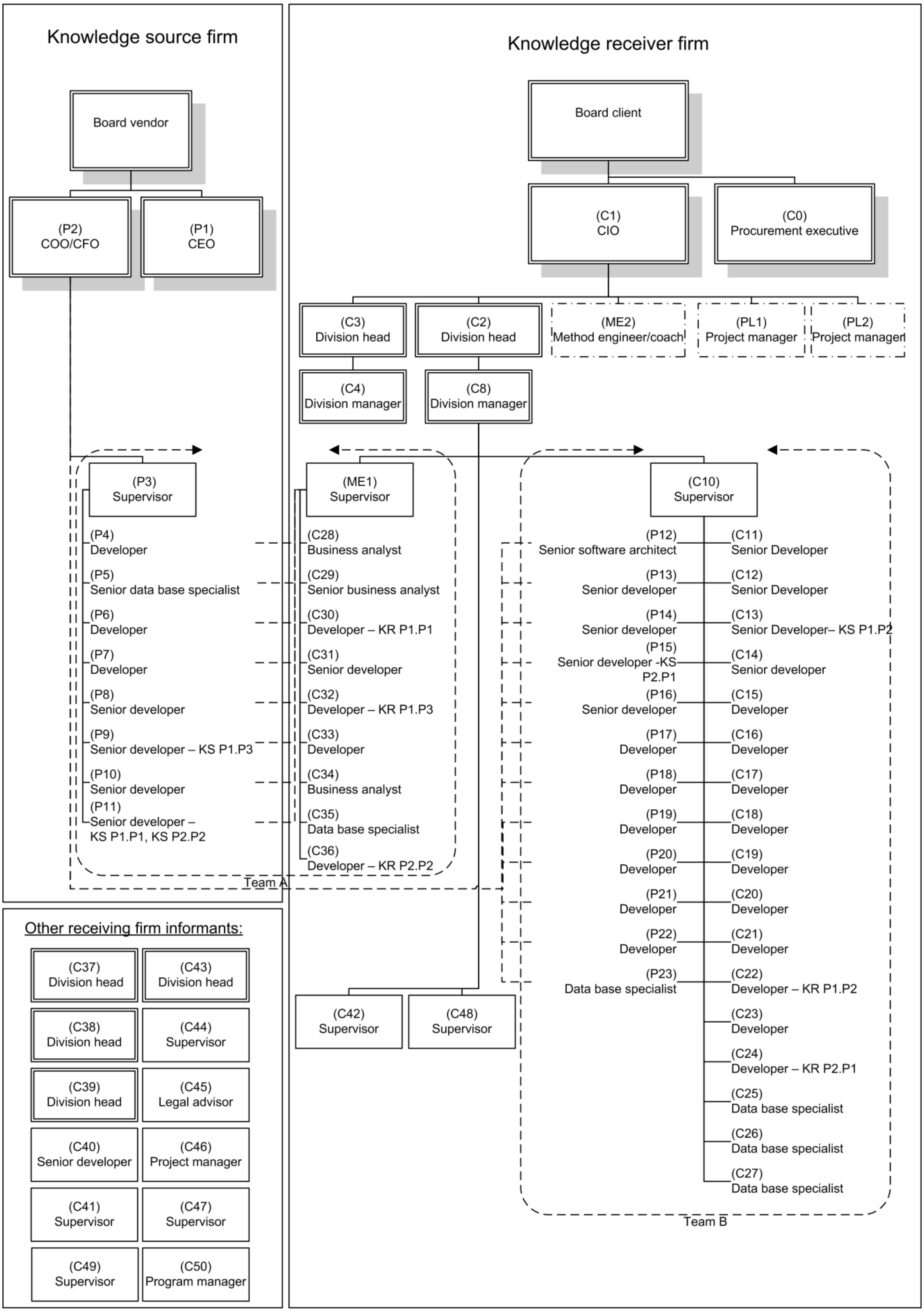
CN.3 (Customer, Provider)

CA.1 (Customer, Provider)

CA.2 (Customer, Provider)

CA.3 (Customer, Provider)


1-5
6-10
11-25
26-50
51-100
101-250
Cummulated code frequencies
Control and measurement
Cost benefit analysis
Penalties and santionc in contract
Termination agreement in contract
Measure KT success through on-the-job results
Control
(Verhoef 2005; Davenport, De Long et al. 1997)
Communication
Give responsibility
Create trust
Acceptance
Trust
(Granovetter 1985; Ring and Ven 1992)
Create transparency
Create ambiguity
Future organization
Transparency
(Power, Bonifazi et al 2004)
Future tasks of knowledge source
Principles
(Braun & Wortmann 2005)
Structured and process oriented execution
Structure
Togetherness
Divided responsibility
Participatory planning
Shared risponsability
Participatory
(Vroom & Jago 1988)
Financial incentives
Immaterial incentives
Positive incetives
Negative incentives
Motivation
(Herzberg 1968)
Investigate
Incentives
Design
Select
IT sourcing step
Negotiate
(Cullen, Seddon, et al. 2006)
Manage
Transition
Procedure model
(Braun & Wortmann 2005)
Initiation
Implementation
Knowledge transfer phase
Integration
Ramp-Up
(Szulanski 1999)
Knowledge manager
Knowledge source
Knowledge receiver
Role model
Constituent method elements
(Braun & Wortmann 2005)
Supervisor knowledge receiver
(Braun & Wortmann 2005)
Supervisor knowledge source
Project manager knowledge transfer
Project sponsor knowledge transfer
Program office
Program manager knowledge transfer
Coach
SLA
Skill catalogue
Information model
Semi formal manifest
(Braun & Wortmann 2005)
Document creation
(Chini 2004)
Capture and transfer
E-Mail
Externalization
Document collection
(Nonaka & Takeuchi 1995)
(Chini 2004)
Team collaboration tools
General purpose office software
(Chini 2004)
Decision support systems
(Chini 2004)
Databases
(Chini 2004)
Web-based access to data
Combination
(Chini 2004)
Intra and internet pages
(Nonaka & Takeuchi 1995)
Knowledge store
(Chini 2004)
Best practices and lessons learned
(Chini 2004)
Face-to-face meetings
Techniques
(Chini 2004)
Learning-by-doing
Internalization
(Braun & Wortmann 2005)
(Chini 2004)
Learning by observing
(Nonaka & Takeuchi 1995)
(Chini 2004)
On-the-job training
Employee transfer
(Chini 2004)
Apprentices and mentors
Socialization
(Chini 2004)
Subsidiaries projects
(Nonaka & Takeuchi 1995)
Knowledge identification
Knowledge transfer planning
Self Study
Activities
Tandem
(Braun & Wortmann 2005)
Project reflection
Ad-Hoc reflection


Knowledge source firm
Board vendor
(P2) COO/CFO
(P1) CEO
(P3) Supervisor
(P4) Developer
(P5) Senior data base specialist
(P6) Developer
(P7) Developer
(P8) Senior developer
(P9) Senior developer – KS P1.P3
(P10) Senior developer
(P11) Senior developer – KS P1.P1, KS P2.P2
Team A
Knowledge receiver firm
Board client
(C1) CIO
(C0) Procurement executive
(C3) Division head
(C2) Division head
(ME2) Method engineer/coach
(PL1) Project manager
(PL2) Project manager
(C4) Division manager
(C8) Division manager
(ME1) Supervisor
(C28) Business analyst
(C29) Senior business analyst
(C30) Developer – KR P1.P1
(C31) Senior developer
(C32) Developer – KR P1.P3
(C33) Developer
(C34) Business analyst
(C35) Data base specialist
(C36) Developer – KR P2.P2
(C10) Supervisor
(P12) Senior software architect
(P13) Senior developer
(P14) Senior developer
(P15) Senior developer -KS-P2.P1
(P16) Senior developer
(P17) Developer
(P18) Developer
(P19) Developer
(P20) Developer
(P21) Developer
(P22) Developer
(P23) Data base specialist
(C11) Senior Developer
(C12) Senior Developer
(C13) Senior Developer– KS P1.P2
(C14) Senior developer
(C15) Developer
(C16) Developer
(C17) Developer
(C18) Developer
(C19) Developer
(C20) Developer
(C21) Developer
(C22) Developer – KR P1.P2
(C23) Developer
(C24) Developer – KR P2.P1
(C25) Data base specialist
(C26) Data base specialist
(C27) Data base specialist
Team B
(C42) Supervisor
(C48) Supervisor
Other receiving firm informants:
(C37) Division head
(C43) Division head
(C38) Division head
(C44) Supervisor
(C39) Division head
(C45) Legal advisor
(C40) Senior developer
(C46) Project manager
(C41) Supervisor
(C47) Supervisor
(C49) Supervisor
(C50) Program manager

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See companion CD-ROM:
Appendix/ Appendix L - Knoweldge Transfer Phase One Pilot Designs 31.03.2006.ppt

Appendix/ Appendix L - Knoweldge Transfer Phase One Pilot Evaluation - Phase Two Pilot One30.08.2006.ppt
Appendix/ Appendix L - Knoweldge Transfer Phase TwoPilot 2 Desion plus BONUS Pilot 02.02.2007.ppt

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See companion CD-ROM:
Appendix/Appendix N - Template check list for pre-conditions X2.0.doc

See companion CD-ROM:
Appendix/Appendix O - Template for knowledge item catalog X2.0.xls

See companion CD-ROM:
Appendix/Appendix P - Template knowledge transfer program X2.0.xls

See companion CD-ROM:
Appendix/Appendix Q - Template roles X2.0.vsd

See companion CD-ROM:
Appendix/Appendix R -Template for knowledge transfer risk analysisX2.0.xls

See companion CD-ROM:
Appendix/Appendix S -Template for knowledge item specificationX2.0.doc

See companion CD-ROM:
Appendix/Appendix T - Template knowledge transfer manifest X2.0.doc

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See companion CD-ROM:
Appendix/Appendix W - Template ad-hoc reflection X2.0.doc

See companion CD-ROM:
Appendix/Appendix X - Anforderungen x0.11.xls

Appendix/Appendix X - Graph Tool Requirements 30.08.2006.ppt

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See companion CD-ROM:
Appendix/Appendix Z - Review The Method x2.0.8 - KONSOLIDIERT & PRIORISIERT v2.0.xls
Appendix/Appendix Z - Review The Method Review Fassung V1.0 x1.9.xls

The reviewed material (i.e., WIT Care Packs V1.1. and WIT Method x2.0.8) is available on request and after an individual request review at:

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